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ABSTRACT

An experiment was performed to determine the efficiency of simulation teaching techniques in training elementary education teachers to identify and correct classroom management problems. The two presentation modes compared were film and audiotape. Twelve hypotheses were tested via analysis of variance to determine the relative efficiency of these modes for training sixty-five sophomore, junior, and senior education students. Measures taken included response quality, cues discriminated, response errors, stimulus recyclings, elapsed time, and attitude change. Results on most hypotheses were equivocal, and experimental bias was held to be a source of obfuscation in the results. Results showed that sophomores learned less quickly during the first half of training, but made up the difference during the second half. Subjects trained with films showed similar initial inefficiency, while audiotape subjects discriminated fewer cues initially. Effects attributable to training level tended to be nonsignificant measures of effectiveness. A bibliography is included. (BB)

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THE EFFECTIVENESS AND EFFICIENCY OF TWO TYPES OF SIMULATION AS FUNCTIONS OF LEVEL OF ELEMENTARY EDUCATION TRAINING

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Gerald R. Girod

Washington State University

Pullman, Washington

September, 1969

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SUMMARY

Veteran and novitiate teachers have expressed and demonstrated an inability to deal flexibly with classroom management problems. In the 10-year period, 1960-1969, the study and use of instructional simulation techniques has been increased in an effort to aid teachers in dealing adaptively with teacher-student interactive situations.

Due to the large number of instructional simulations and a paucity of research, teacher training institutions are forced to decide intuitively which type to implement. The choice of the appropriate level of reality is the focal point in the selection process. A simulation closely modeling reality may confuse the less adept learner while a less realistic device may bore the more sophisticated student.

Twelve hypotheses were tested via analysis of variance to determine the relative effectiveness and efficiency of two types of simulations used in training 65 sophomore, junior, and senior students at Washington State University during the academic year 1968-1969. Measures were taken for response quality, cues discriminated, response errors, stimulus recyclings, elapsed time, and attitude assessment.

One-half of the subjects from each class level were trained in handling classroom management problems using the 20 episode Classroom Management films developed by Kersh at the Teaching Research Division, Oregon State System of Higher Education. The remaining subjects were trained with audio-tape descriptions of the Kersh films. All groups were tested with both stimulus forms--films and audio-tapes--using a comparable set of 20 episodes.

Of the 12 null hypotheses, eight were rejected. The independent variables of elementary education training and stimulus form were most influential in the rejection of all five hypotheses categorized as indices of efficiency. Once three of the seven hypotheses categorized as measures of effectiveness were rejected.

Sophomores tended to be less efficient to train during the first-half of training. Subjects working with films were also initially less efficient to train. The differential effects noted for level and form tended to decrease in the second-half of training. Effects attributable to training level tended to be non-significant for measures of effectiveness. No significant attitude differences were noted as a result of training format.

CHAPTER I

INTRODUCTION

Problems and Objectives

In recent years there has been a shift away from efforts which prepare teachers mainly by instructor verbalization. Many attempts, notably those at Stanford (Allen and Gross, 1965), the University of Tennessee (Cruickshank and Broadbent, 1968), and Teaching Research in Oregon (Kersh, 1963), have been directed toward allowing the student trainee (St) to learn and to practice teaching behaviors under the guidance of a structured program. Each of these programs assumes that by learning to operate in a simulated classroom environment, there will be some knowledge gained that will provide the St with selected transfer skills thus aiding him to become a successful teacher.

Those preparing the above simulated programs, and others like them, built their packages on the belief that active rather than passive roles in the educational process are more effective in student knowledge acquisition. These programs have attempted to involve the St in the decision-making process of teaching earlier than usual. Simulation programs which aid in the instruction of handling classroom management problems (Cruickshank and Broadbent, 1968; Kersh, 1963; Wallen, 1968) have been designed to remove the St from a lecture setting (passive learning) to the laboratory (active learning).

All these simulations are also based on the assumption that there are specific and predictable ways to handle classroom management problems that will be more effective and/or efficient than others. If a St implements these actions, it is assumed the St can be identified as approaching or possessing the behaviors of a "good" teacher.

Educational simulations of all types have been hindered by the designers' inabilities to specify behaviorally which skills are to be learned. Consequently, it has been even more difficult to specify where a particular simulation package would be used in teacher education programs. Several designers used their materials with upperclassmen--juniors and seniors (Kersh, 1963, 1965b; Wallen, 1968). There were no specific attempts to determine at what level these materials should be used or at what level (if any) they may not be particularly useful in training teachers to identify and correct classroom management problems.

At least one simulation experimenter has spoken in part to this problem of a cross-level analysis of simulation efficiency. Twelker (1967) has asked, ". . . how does the pretraining level of student teachers interact with variables such as mode of presentation?" Presentation mode is an important variable because it can be implemented to control problem complexity. The number of cues inherent in one mode may confuse a novitiate and bore a sophisticated student.

This study examined the general problem: At what level of college training can simulations of filmed or audio-tape (two presentation modes) classroom management episodes be deemed most effective and/or efficient in training elementary education students to identify and correct classroom management problems? That is, what students--sophomores, juniors, or seniors--will benefit most from the time and manpower commitment to simulation? It was to this general problem that the current study was directed. If simulation activities are to become commonplace in teacher education (as there is good reason to believe), then the most efficacious utilization must be determined empirically rather than intuitively.

Related Literature

Classroom Management

Effectiveness in handling student communication and management situations has long been suspected as being a major problem of classroom teachers. Researchers have generally found these suspicions to be correct (Wey, 1951; Swineford, 1962; D'Amico, 1960). For the beginning teacher this difficulty is not unexpected. Veteran teachers also concur with this trend to an overwhelming degree. Kaplan found that Oregon elementary teachers attributed 84 per cent of their sources of "distress" to the behavior of children (1952, p. 664).

The National Education Association Research Division (National Education Association Journal, 1964) polled a national sample of public school teachers who had taught five or more years and asked: ". . . do you believe that maintaining pupil discipline has become more difficult than when you first started teaching?" Generally, these veteran teachers were about equally divided in their opinions, with 45 per cent stating it was more difficult, 20 per cent responding that it was less difficult, and 34 per cent saying that maintaining pupil discipline was about the same as when they began teaching. When the results were analyzed in terms of years of experience, an interesting trend was revealed. For those who had taught 5 to 9 years, 10 to 19 years, and 20 or more years, they stated that maintaining pupil discipline was more difficult by the percentages of 25, 44, and 62, respectively. Those who stated that it was less difficult responded at 31, 21, and 12 per cent levels for the corresponding years of experience. The National Education Association pollsters drew one conclusion from these opposing curves:

> One thing can be said with certainty: a substantial proportion of experienced teachers feel that their problems of maintaining discipline have increased since they began teaching (National Education Association Journal, 1964).

The factors that influence such a changed self-concept are not all known, but apparently they are powerful. It can be inferred that these same unascertained variables probably have a potent impact on the student teacher. A study completed by Dumas would tend to support this inference. Dumas examined 94 students, who had just completed their practice teaching, by way of a semantic differential rating scale. Ninety-two of the 94 respondents viewed themselves (their self-concept) as changed[1] by their student teaching experience (Dumas, 1969, p. 277). How much of an effect student-teacher interactions had on the self-concept is not the point here. From the previously noted research, it would seem safe to assume that classroom management and communication events certainly played a viable part in the resultant change in self-concept so dramatically indicated by Dumas' data.

The above cited research apparently indicates that teachers and student teachers are concerned with, and challenged by, classroom incidents, with the concern and effect varying. Some teachers become more adept and/or more confident in handling classroom management and communication situations, while others seem to become less confident and more inept. The reason for this unequal and opposing change has been discussed by Turner and Fattu who wrote that:

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[1] ". . . twenty-five student teachers (27% of the sample) viewed themselves with less favor at the completion of student teaching than at the beginning; two (2% of the sample) were unchanged; while sixty-seven (71% of the sample) demonstrated a more favorable perception of self at the completion of student teaching," (Dumas, 1969, p. 277.

> Teacher behavior . . . is problem-solving behavior of a particular kind . . . To determine why (some) teachers might solve a wider scope of problems than other segments of the teaching population, it is necessary to return to the assumption that teacher behavior consists largely, but by no means entirely, of instrumental responding . . . Instrumental responding may be viewed as learned responses . . . This notion . . . suggests the hypothesis that the teachers who are the best solvers of teaching problems are those who have acquired the greatest number of instrumental responses and who can best transfer those responses to "new" or variant situations (1960, pp. 16-17).[2]

Another set of phrases which would describe the quality to which Turner and Fattu refer to above would be "flexibility in responding" or "lack of rigidity in interaction." Whether Turner and Fattu's contention is correct is impossible to verify, though their argument is logically attractive.

Empirical evidence does tend to bear out the concept of interactive rigidity by teachers. Zahorik (1968) tabulated the feedback[3] behavior of 15 elementary teachers and found that of 175 feedback behaviors used, only 16 were used with regularity. The conclusion drawn by Zahorik was:

> The results concerning general feedback usage suggests that teacher-verbal feedback during the interactive classroom situation is a rather rigid behavior. Only a few types of feedback are used with regularity . . . (1968, p. 149).

A study performed by Chabassol (1968) attempted to identify predictive elements of rigidity in terms of student teacher success. Using a semantic differential rating scale to measure rigidity of thinking, Chabassol found that three of the five measures predicted the success of 131 female elementary student teachers to the .01 level. If, as the previous study would tend to indicate, flexibility can positively effect student teaching success, then it would be beneficial for teacher training institutions to identify those experiences within their curricula that tend to make their graduates more flexible, particularly in their interactive behaviors.

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[2] Originally quoted in Lynch, 1961, p. 7.

[3] Feedback:--". . . those oral remarks which reflect on the adequacy or correctness of the pupil's solicited or initiated statements," (Zahorik, 1968, p. 147).

One of those experiences over which the college or university has limited control is that of student teaching. Hoy (1967) found that a sample of 130 elementary student teachers changed their response pattern to one of more "custodial" behavior[4] after student teaching. This more rigid interactive behavior changed to such a degree that it reached the .001 level of significance from the entry student teaching pattern (Hoy, 1967, p. 154).

Hoy's research would indicate that teacher training institutions need to bring more potent experiences to their students if the schools are to produce teachers who achieve a quality of greater interactive flexibility. If Ishler is correct that, "Student teachers, seemingly, are still at a relatively malleable stage with regard to teaching strategies" (1967, p. 121), then, certainly, prior to their practice teaching, it would be advantageous to give them experiences with teacher-student interactive behaviors. With such training, the university or college which values more humanistic--as opposed to custodial[5]--behavior in their student teachers can provide alternatives to the apparently more common authoritarian pattern of veteran teachers.

Colleges and universities must provide models before practice teaching because, seemingly, students pattern themselves after their supervising teachers. It may be that the student teachers unknowingly become more rigid. Lambert, reporting on a nation-wide National Education Association questionnaire sample of beginning first year teachers, stated that the respondents generally believed that their training institutions needed to provide more alternatives in handling discipline problems (1956, p. 349). This conclusion tends to support Turner and Fattu's belief that the effectiveness of problem-solving behavior of teaching is due to flexibility or alternatives of strategy.

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[4] "The custodial school is conceived as an autocratic organization with a rigid pupil control status hierarchy . . ." (Hoy, 1967, p. 153).

[5] A dichotomy defined by Hoy (1967, p. 153).

It is Lynch's contention that the desired effects can be brought about by "proper" training when he states that:

> The nature of teaching experience is such that, with proper pre-service . . . training, understandings derived from such training will not only be applicable, but continued experience will at least not interfere with scientifically based understandings acquired in training, and, at best, will be reinforced and refined with experience. Most optimistically, it is hoped that, if the originally learned concepts of behavior are valid, experience will reinforce and refine their essential validity (1961, p. 9).

With all the wide range of techniques available, choosing the "proper" training to provide the needed alternatives in classroom management and communication behaviors which institutions value is not a simple task. This study has attempted to examine selected factors which are components of one technique--laboratory simulations. The purpose of the study was not to identify which behaviors are most valuable but rather how the chosen set of behaviors might best and most feasibly be communicated--the decision which institutions are now forced to make from an intuitive rather than empirical framework.

Simulation

Simulation is a relatively new technique in teacher education. Definitions are as multifarious as are the types of simulations. Garvey (1967, p. 6) offered one of the most encompassing definitions; ". . . an artificial situation which reproduces in essential details either a model of an actual situation or a model which depicts a hypothetical situation."

Another is provided by Massialas and Cox: "A simulation model would attempt to reduce a complex phenomenon to one that is manageable" (1966, p. 318). Both of these definitions of simulation contain the common component of modeling reality. Due to the lack of specificity, another definition is offered to distinguish between such models as a classroom sociodrama, the enactment of a simulated ICBM flight, or the model of a cell.

Abt (1966) delineated simulations as (1) models, (2) exercises, and (3) instructional simulations. Models are those simulations that portray in an inactive manner the characteristics of a concept such as a traffic pattern model.

Exercises, the second type, are activities designed to allow the student to interact with someone or a machine, e.g., army maneuvers.

The third type, instructional simulations, are the representations of real events where the student participant is engaged in learning a behavior to be measured against some standard. Instructional simulations are designed to teach knowledge or a skill. Examples of this type are Link Trainers and the Classroom Simulation Materials developed by Teaching Research (Kersh, 1963).

Instructional simulations, wrote Twelker, perform three functions: "(1) present information; (2) elicit responses or provide a situation for practice; and (3) assess performance" (1968, p. 3). The above tasks are comparable to those of programmed instruction. Beaird and Standish made the distinction that, "programmed instruction is typically concerned with 'learning what to do' whereas (instructional) simulation training . . . is characterized by 'learning by doing,'" (1964, p. 11). The accomplishment of the three tasks by "doing" have historically found widespread use in various areas.

Military establishments were instrumental in the development of simulations as training techniques (Crawford, 1966, 1967; Steward, 1965). Early use of simulations has been traced back as far as the early 1900's when the Prussian army generals devised war games to practice their troops (Robinson, 1966, p. 85). Recently the business world has also made use of various simulation activities (American Management Association, 1961; Guetzkow, 1962; Anderson et al. 1964). Simulations are common teaching devices in undergraduate business schools to instruct students to become more adept in financial and personnel decision-making.

Educators have made use of simulations for years--play stores, school councils and school pageants are simulations that have long been common teaching devices. These early efforts were not done to study the effectiveness of any technique. Rather, they were implementations by classroom teachers who had faith in the ability of the simulation to be a useful teaching device. Concerted effort to study and use simulations did not become apparent until the early 1960's. Since that time some of the advantages concomitant with the use of instructional simulations have been identified.

Instructional Simulations

Four factors seem to be generally identified as a result of a simulation usage: (1) attitude changes, (2) behavior changes, (3) increased ability to correctly apply principles, and for the instructor's benefit, (4) the capability to control problem complexity. Some instructional simulations seem capable of capitalizing on less than all four advantages, e.g., simulation "A" may derive an attitude change while the participants seem to gain little toward changing long-range behavior, while simulation "B" may accrue an opposing result. Each of the above four advantages posited has some supporting research.

The most supportive writer of the contention that simulations derive an attitude change is Cherryholmes (1966). In an examination of the compiled results of six studies on simulation, Cherryholmes found that "Students participating in a simulation will reveal more interest in a simulation . . . than in more conventional classroom activities," (1966, pp. 5-6). One of the six studies involved an exposure to a simulation dealing with an international relations game where the principal investigator, Cherryholmes, inferred that the student participants experienced an attitude change denoted as moving toward that of a "realist" (1965, p. 230). Other writers have noted positive attitude shifts as a result of simulation training (Cruickshank, 1966; Vlcek, 1965; Bond, 1965).

Weinberger (1965), using a follow-up questionnaire, found that school administrators felt that their behavior on the job was modified as a result of simulation training dealing with administrative difficulties. Other researchers finding a behavior modification include Kersh's examination of student teacher responsibility patterns (1965b), and Vlcek's study which indicated that supervising teachers perceived that student teachers trained in a program using simulation exhibited more self-confidence than did those students without simulation training (1965).

Several investigators indicated that an increased ability to apply principles was an outcome of a simulation experience. Ryan found that an experimental group using simulations was significantly more capable (significant to the .001 level) in learning to apply principles from educational psychology than was the control group (1968, p. 250). In a study that used films which simulated a teacher's administration of a reading inventory, Utsey et al. (1966), found that the materials provided a significant factor in developing the skill of college level juniors and seniors in identifying reading levels of children.

One negative finding was reported by Robinson (1966) in an examination of a case-study simulation versus a lecture technique in teaching principles of political science. Robinson concluded that, "No direct and unmediated relation exists between simulation and fact mastery or learning of principles," (1966, p. 116). Another author, Ramey faults the case-study method as being unrealistic.

> The basic shortcoming of the case method is the fact that it is static. It fails at the point of major importance--the need for the group to understand that problem solution must occur in a four-dimensional setting, not a two-dimensional one, as cases often imply, (1968, p. 525).

Whether Ramey's analysis of the case-study method may be useful in identifying the factor of realism as limiting Robinson's simulation is debatable. The point is that many researchers have concluded as Twelker did that, ". . . simulation training provided a powerful vehicle for teaching principles . . ." (Twelker, 1966a, p. 60). The capability to teach principles is posited as a potential of simulation, though, as was pointed out earlier, may be a concomitant result when coupled with some other variable.[6]

The fourth advantage, control of problem complexity, has been used most advantageously by the medical profession in training students. Entwisle and Entwisle believe their ability to simplify problems for less sophisticated students was a major factor in the success of their computer simulation of a patient requiring diagnosis (1963, p. 810). ". . . simulations are useful in education . . . because the real world in all its complexity does not lend itself well to the preliminary instruction of beginning students" (Entwisle and Huggins, 1967, p. 379).

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[6] It was also noted earlier that if some advantage does not occur in a simulation others do seem to occur. Robinson, who stated that the experimental group learned no more principles, did find that participation "was overwhelmingly greater" even when the students disliked the simulation experience, (Robinson, 1966, p. 111).

The four advantages which appear to be generalized outcomes from the use of simulation techniques have also been noted for those packages developed for teacher training curricula. Simulations with specific goals of training students in handling classroom management and communication problems have been studied with increasing detail in the 1960-1969 decade.

Classroom Management Packages

Twelker (1968) stated that lectures provide opportunities for the student to listen while others talk about teaching. Classroom experience, however, helps prepare the student to teach. Simulations can be used to allow the trainee to combine practice teaching and self-evaluation of his own teaching efforts. Coleman (1967) pointed out that the immediacy of the evaluative process tends to focus the student's attention on the learning experience. The facility to focus the learner's attention on self-evaluation of his simulated teaching allows simulation to play an intermediate step in the training process.

As an intermediate step, simulation has several advantages peculiar to it alone. It allows the student to learn to discriminate problem cues and, as Twelker states, to "practice decision making without the risk of censure or embarrassment" (1967, p. 201). Because a feedback mechanism is present in some form, the student can learn the consequence of his actions and if need be try out an alternative strategy. Twelker described succinctly the advantage of instructional simulations as "focusing" devices for preservice students:

> Through systematic practice in a simulated classroom, a student learns how to fill the decision-making role of the teacher in the classroom by participating in a comparable role in a simulated situation.

> In brief, instructional simulation forces the student to focus on a situation and devise different modes of responding. Simulation offers the student an opportunity:
>
> 1. to build and to practice his own strategies of searching for cues that signal a decision-making process on his part;
> 2. to test hypotheses he has about how to respond to these problems; and
> 3. to change his behavior in view of the feedback he receives, (1969, p. 9).

Winters (in Of Men and Machines, 1967) also pointed out that the relationship of theory and theory implementation can be more easily established through simulations. Situations relevant to a theory can be portrayed immediately. In the lecture setting or in classroom teaching experiences, the situation usually restricts the description or choice of appropriate examples for theory implementation. Denemark and Holland believe such techniques will allow teacher education students to "systematize practice around a theoretical framework" (1967, p. 242).

Studies into teacher training simulations tend to verify the above conclusions. Vlcek (1965) found that a greater number of alternative classroom management behaviors were employed by students whose training was supplemented by simulation. Cruickshank and Broadbent (1968) found that a filmed simulation experience had a positive influence upon student teaching behavior. Students who had participated in simulation training were observed by the experimenters to have fewer management problems and they were perceived by themselves and their supervising teachers as having fewer management problems.

A study conducted by Hershey, Shepard and Krumboltz stated that their undergraduate student participants had a positive attitude toward a simulated teaching experience because they perceived the training as giving help in "attaining more specific skills" (1965, p. 235). Students' attitudes were more positive when simulation was included as part of an educational psychology course, reported Bond (1965).[7] Vlcek also found a greater degree of self-confidence expressed by an experimental group during their student teaching experience (1965).

In reference to a behavior differential due to a simulation experience dealing with classroom management, two investigators have concurred in the conclusion that a positive change accrued. Kersh (1965b) questioned supervising teachers and found that the practice teachers from the experimental group were ready to assume full responsibility up to three weeks earlier than their non-experimental counterparts. Kersh was also able to duplicate Vlcek's finding concerning the utilization of the principles taught:

> ". . . findings from both Vlcek's study[8] and the present pilot effort indicate that there is transfer of learning from the simulated to the actual classroom. Vlcek's observational data indicate that in the simulated classroom "students" learn principles of teaching which they employ in practice teaching soon after completion of their simulated experience (1965b, p. 15).

What specific attributes of a simulation function to provide these benefits appear difficult to define. Several writers have conjectured that possibly the closer approach to realism may be the feature that provides the beneficiality associated with a simulation (Twelker, 1968; Kersh, 1963; Cruickshank, 1966). Though little research is available concerning the comparative effectiveness of types of simulation, Kersh (1963) tested realism factors such as screen size, filmed feedbacks and color. Only a negligible influence on training effectiveness was attributed to any of these variables.

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[7] The latter study would seem to enhance Winters' argument that the benefit of simulation lies in the effectiveness it has in the immediate portrayal of a situation demanding theoretical implementation.

[8] Vlcek, 1965.

Certainly, the literature is replete with studies comparing the results of differing media instructional settings that show no difference in gain scores (Campeau, 1967). Yet the question of fidelity remains paramount in program design for simulations. If a simulation of a complex event is very realistic the learner may become confused and be unable to distinguish relevant from irrelevant cues. Conversely, an over-simplification of reality by a simulation may bore the more sophisticated learner. Twelker (1968) pointed out that the awareness of prerequisite knowledge and experiences must be an integral part of the design and implementation of simulated training devices. Twelker also stated, "It is conceivable that its lack of realism causes the learner to disregard the instructional experience . . ." (1968, p. 17).

Because, as was pointed out earlier, it is possible to control problem complexity (a realism factor) it becomes crucial for institutions training teachers to identify what level of complexity of simulation can be used most beneficially for the various sophistication and experiential levels of their students. The interaction effects of training level and simulation type (complexity) will be examined in this study.

Related Literature Concerning This Study's Design

The training levels for the study were identified by class standing--sophomore, junior, and senior. If it is assumed that seniors should be more proficient in dealing with children than sophomores and juniors, and juniors more sophisticated than sophomores, then this becomes an important dependent variable. Miller (1967) and Kersh (1965c) found differential effects on entry-exist gain scores. Students who were below the median on pretest scores gained more from a simulation experience on posttest measures than did those who scored above the median. Whether this was a regression effect or one where the initially more capable students had less to learn is unclear.

If it is a result of limited student knowledge which can be rectified by five to six hours of training[9] then institutions may find it to their advantage (and that of their students) to know whether level of training (sophistication) or regression effects the differential gain in simulation training.

Beneficiality of any training program is always tempered by cost factors. Current classroom management packages on the market, such as those developed by Teaching Research, are films or combinations of media. Complete packages are somewhat expensive (more than $1,500 would be a necessary expenditure to implement the Teaching Research Classroom Management materials). If the faculty of an institution wanted to experiment with the various kinds of materials now available, whether in comparative studies, utility studies, or in conjunction with a developmental program of their own, cost in terms of materials and man-hours may become exorbitant. A less costly approach may make implementation and/or experimentation feasible.

To examine the variable of simulation form, a costly type to implement was chosen--films--and a less expensive type was chosen--audio-tapes. If the lack of realism inherent in audio-tapes can be shown to be of a negligible influence then the use of such a medium would not be detrimental to the education of students of a teacher training institution. The second dependent variable, then, chosen for manipulation was stimulus form--films and audio-tapes.

Comparative studies in media research have been soundly criticized (Lumsdaine, 1963; Campeau, 1967). Lumsdaine, one of the sharpest critics, listed five criteria that he believes a comparative study should meet for it to be implemented (1963, pp. 598-599). The criteria and the attributes of this study which meet those conditions follow.

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[9] The average number of hours spent in training in both the Miller and Kersh studies.

A large differential in cost and limited differential in effectiveness.--If an audio-tape method can be shown to be nearly as effective in training students then an enhanced feasibility to additional package development and experimentation can be established.

Methods compared are defined analytically.--In the procedures section analytical definitions of both methods have been provided.

Lack of generality.--Because only two simulation media types are being compared, it is impossible to generalize to a continuum of reality. Knowledge of differences or similarities in these two types should be of value to teacher-training institutions by indicating whether additional research might be fruitful.

Appropriateness of method of study.--Due to the vast number of measures possible and the possibility for uncontrolled interaction in a simulation setting, it was deemed necessary to control carefully the stimulus form and feedback form. The experimental design chosen allows for this control.

Duplication of research effort.--A search of the literature provided no indications that previous research had examined the question of the effectiveness and efficiency of differing simulation training for varying levels of education training. No research was found that indicated that training level had been examined in any way except in a related field (Entwisle and Entwisle, 1963) and then only to describe, without supporting data, the conclusion that sophistication level does influence the learner's behavior in the simulation training.

Because the design of this project meets all of the above criteria enumerated by Lumsdaine, the question of the efficacy of such a comparative study is assumed to be resolved.

The independent variables can be categorized as measures of effectiveness and of efficiency of training. To ensure a valid measure of efficiency, the training mode was selected on the basis of work done by Twelker (1966a). The training mode which was identified by Twelker's study as most efficient was adapted for use in this experiment.

Three measures were taken as indices of efficiency--(1) time spent in training and testing, (2) recycling of stimuli, and (3) the number of training prompts necessary. An index of effectiveness was determined by another set of three measures--(1) attitude of subjects toward simulation training, (2) the sum of cues identified, and (3) the sum of first response scores. The latter two scores were taken for training and testing measures.

All the measures for effectiveness and efficiency were categorized in a similar fashion by Twelker, (1968, pp. 30 and 38). The interaction of these variables with stimulus form and levels of training were designed to give some indication of the validity of 12 hypotheses which were tested in this experiment. The hypotheses, operational definitions, and a more specific discussion of the study design follow in the next chapter.

CHAPTER II

DESIGN OF THE STUDY

Hypotheses

This study examined 12 hypotheses. To ensure a comprehensive analysis of each hypothesis, selected sub-hypotheses were incorporated in the study design. Each hypothesis and any resultant sub-hypotheses are discussed below. A statistical significance of .05 or less was the level selected for rejection of a null hypothesis. The hypotheses follow stated in the null form:

There will be no significant difference between sub-groups in:

1. The mean first response score for training
    a. The mean first response score for the first-half of training
    b. The mean first response score for the second-half of training
    c. The mean first response score for the total training
    d. The mean gain first response score
2. The mean incorrect response score for training
    a. The mean number of incorrect responses for the first-half of training
    b. The mean number of incorrect responses for the second-half of training
    c. The mean number of incorrect responses for the total training
    d. The mean reduction score for incorrect responses
3. The mean number of initial cues discriminated during training
    a. The mean cues discriminated during the first-half of training
    b. The mean cues discriminated during the second-half of training
    c. The mean cues discriminated during the total training
    d. The mean gain for cues discriminated

4. The mean number of stimulus recyclings to achieve a type A[1] response

5. The mean number of experimenter (E) prompts necessary to reach criterion (a type A response)

    a. The mean E prompts for the first-half of training
    b. The mean E prompts for the second-half of training
    c. The mean E prompts for the total training
    d. The mean reduction score for E prompts

6. The mean number of E prompts necessary to achieve criterion for cue discrimination

    a. The mean E prompts for the first-half of training
    b. The mean E prompts for the second-half of training
    c. The mean E prompts for the total training
    d. The mean reduction score for E prompts

7. The mean time for training and testing

    a. The mean time for the first-half of training
    b. The mean time for the second-half of training
    c. The mean time for the total training
    d. The mean reduction in training time
    e. The mean time for the total testing
    f. The mean reduction in training time minus testing time

8. The mean response score for testing

    a. The mean response score for oral stimulus episodes
    b. The mean response score for film stimulus episodes
    c. The mean response score minus the placebo episode
    d. The mean response score

9. The mean number of cues discriminated for testing

    a. The mean cue discrimination score for oral stimulus episodes
    b. The mean cue discrimination score for film stimulus episodes
    c. The mean cue discrimination score minus the placebo episode
    d. The mean cue discrimination score

10. The mean first response change scores (training to testing)

    a. The mean response change score for similar problem episodes
    b. The mean response change score for episodes with similar standards
    c. The mean response change score

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[1] See Appendix F or item 11 in the following section, Definition of Terms, for an explanation of a type A response.

11. The mean change score for cue discrimination (training to testing)

    a. The mean change score for cue discrimination for similar problem episodes
    b. The mean change score for cue discrimination

12. The mean attitude score

Definition of Terms

1. Classroom management problems are those situations that occur within the course of a filmed or verbalized sequence that require a response by the student trainee (**St**). The problems are divided into two general types: (1) management problems (disorderly behavior, general discipline) and (2) communication problems (confusion, inattention by a group or individuals). See Appendix F for an enumeration of the episode types which constitute management and communication problems.

2. Criterion level is, for a given episode, the **St**'s: (1) response to a simulated classroom problem which matches Kersh's (1963) categorization of an adequate response or (2) the **St**'s assessment of the relevant cues which matches the total list, prepared by Kersh (1963), of cues to be discriminated.

3. Cue discrimination is the act of assessing the relevant details in an episode by the **St** such that the **St** makes known to the experimenter (**E**) that he has observed (heard and/or seen) the problem situation.

4. Feedback is the term used to identify the communication given by the **E** to the **St** of the most likely consequence of the **St**'s behavior.

5. Filmed stimulus situation is the presentation of the filmed classroom management problem to the **St** by the **E**.

6. Initial cue discrimination is the act performed by the **St** of identifying problem cues before any **E** prompts are given.

7. Orientation is the process of providing the **St** with the necessary knowledge of the simulation training and testing and of the simulated students to facilitate the **St**'s optimal responding to the training and testing situations. A two-step process is required: (1) slide-tape and film presentation concerning the class and (2) a verbal presentation by the **E** prior to training.

8. Placebo episode is the first episode presented to the **St** during testing. The stimulus form of that episode is the same as that of the **St**'s training stimulus form.

9. Recycle is the training procedure whereby the **E** directs the **St** to view or hear the episode again for (1) cue discrimination or (2) a new response more likely to achieve a positive consequence.

10. Response is a verbal and/or physical enactment of the St's behavior with the intent to alleviate the perceived problem. A response can also entail a decision to make no enactment but the St must state to the E that this was a decision and not just an ad hoc omission.

11. Response types are the categorizations of St responses in terms of the two standards originally assigned each episode by Kersh (1963). If a St's response incorporated both standards it was classified as a type A response. Responses which incorporated one standard but not the other were categorized as type B or C. Type D responses were St verbalizations which were directed toward the problem but exemplified neither standard. A St response which was directed to an irrelevant incident (not the problem identified by Kersh, 1963) was denoted as a type E response. Appendix F portrays this procedure via a table.

12. St is the abbreviation for student trainee. The trainee played the role of a student teacher being supervised by the hypothetical "Mr. Land," who is featured in both stimulus forms. All subjects played this role.

13. Simulation is the act of constructing, operating, manipulating or representing the model or techniques of a student teacher (Twelker, 1968, p. 7). Garvey has provided a more general definition by stating that simulation is ". . . the use of role-playing by the actors during the operation of a comparatively complex symbolic model of an actual or of a hypothetical social process" (1967, p. 11).

14. Standards are the "rules of procedure applicable to problems of classroom management and communication" (Kersh, 1965c, p. 34). Those principles which the St is expected to model or exemplify in his enacted response to a simulated classroom problem.

15. Testing is the post-training procedure to assess the St's ability to discriminate cues and enact responses to stimulus situations. No E prompting or St recycling will occur during this phase. One-half of the 20 testing episodes will be presented via films and the other half by audio-tape.

16. Training is the act of teaching, via films or audio-tape presentations and E prompts, the St to reach a predetermined criterion level on two measures--(1) cue discrimination and (2) response enactment. These individual sessions constituted work with 20 sequential episodes.

17. Verbal stimulus situation is the playing by the E to the St an audio-tape description of a classroom management problem. The description contained information concerning the problem scene and the relevant cues to be discriminated.

Assumptions

The work for this study was based on the following assumptions:

1. That the above materials were capable of presenting classroom management and communication principles
2. That these principles, when learned by the Sts, were capable of being tested by valid and reliable measures
3. That the Sts randomly selected to participate were representative of the three training levels at Washington State University, i.e., sophomores, juniors, and seniors
4. That the ability to discriminate cues is a St behavior capable of being improved and therefore transferable to the testing situation
5. That the principles of behavior (standards) learned from training were learned implicitly and that they would transfer to the training situation
6. That the episodes presented by audio-tape were comparable to the filmed simulations in terms of their capability to elicit type A responses and a criterion level for cue discrimination

Limitations

The knowledge gained from this study will be limited by four restrictions:

1. All the subjects were drawn from a sample of Washington State University students who were enrolled as prospective elementary school teachers.
2. Though the subjects were randomly selected from a list of volunteers, the small N for each sub-group could have been influenced by one or two subjects who were either extremely adept or inept in dealing with simulated classroom management and/or communication problems.
3. Only one experimenter (E) participated in St training. This person has been reliable when compared with other Es in past studies (Twelker, 1966a). No measures could be taken to ensure reliability on cue discrimination and categorization or responses in this study for training measures.
4. Only two types of instructional simulation were examined across all training levels--(1) audio-tape presentations to individual Sts and (2) filmed presentations to individual Sts. Generalizations pertain to these stimulus forms only.

Stimulus Forms

Two types of stimulus forms--films and audio-tapes--were chosen for comparison. The film form was a package of 40 classroom episodes developed by B. Y. Kersh at the Teaching Research Division[2] (Kersh, 1963). The episodes ranged in length from approximately 15 seconds to two minutes. These films were two sets of sound-color 16mm motion picture films with each set containing 20 problem episodes. Each set of episodes constituted one hypothetical school day. All episodes were serially ordered with each episode following the previous one in a chronological pattern, thus forcing the St to become aware of time-oriented instructional problems such as pupil fatigue. For each of the episodes there were two or three feedback films available in the Kersh package, but no direct value had been found for the Sts when only a filmed feedback was used (Kersh, 1965c, p. 41), so the feedback materials were not used in this study. (A more complete description of these materials is given in Kersh, 1963.)

Each set of 20 episodes was made up of two different problem types. One-half of the film sequences were posed as problems in classroom management for the St, with the remaining one-half being classed as communication problems. (A more detailed description is shown in Appendix F.)

The second stimulus form was an audio-tape description of each of the filmed episodes. (A more complete description of the production of the audio-tapes is found in the Procedures chapter of this report.) There were two sets of tapes, each corresponding to one of the sets of 20 filmed episodes.

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[2] The Teaching Research Division is a part of the Oregon State System of Higher Education. Members of this organization have performed research for various educational levels as well as private industry. Teaching Research Division, as it will be referred to hereafter, has been best known for the research which emanates from its staff on the use of simulation techniques in teacher preparation.

The possible differences in the complexity of either set of episodes for either stimulus form was controlled for within the experimental design. In the conduct of the experiment, one of the two sets was used in training one-half of each training level and the other set for testing. The other one-half of each training level used the second set of films or audio-tapes for training and the first set for testing.

Subjects

Three sets of subjects were randomly selected from a group of volunteers. All volunteers were either sophomores, juniors or seniors majoring in the elementary education program at Washington State University during the spring semester of 1969. Only full time undergraduates 25 years of age or younger who had never taught under contract or who had never student taught were used.

Twenty-two subjects were needed for each training level set, i.e., 22 sophomores, 22 juniors, and 22 seniors. Twenty-eight sophomores and 136 juniors volunteered to act as subjects. Because many seniors had student taught or would student teach before the training was completed, only 25 female seniors and one male senior volunteered. To keep the sex differences proportionate, only one male per training level could be used.

Due to scheduling conflicts and students who dropped out of school, it was possible to train 21 seniors rather than the proposed 22. All Sts were randomly assigned to their respective stimulus forms and sets within their training levels. The number of subjects for each training level for each stimulus form and for each set of training materials are shown in Table 1 below:

TABLE 1

DESIGN OF THE STUDY

Training Level	Stimulus Form				Total by Level
	Film		Oral		
	Set 1	Set 2	Set 1	Set 2	
Sophomore	N= 6	N= 5	N= 5	N= 6	N=22
Junior	N= 5	N= 6	N= 6	N= 5	N=22
Senior	N= 5	N= 6	N= 6	N= 4	N=21
Total by Set	N=16	N=17	N=17	N=15	
Total by Form	N=33		N=32		
Grand Total	N=65				

As was previously noted, the study design controlled for the differences which might accrue from the unknown variations in the two sets of episodes. This was done by training one-half of each level using set 1 and one-half using set 2. Testing was accomplished by using the opposite set for each level. The study design showing only the training level by stimulus form (the independent variables) is provided in Table 2.

TABLE 2

DESIGN OF THE STUDY: LEVEL BY FORM

Training Level	Stimulus Form		Total by Level
	Film	Oral	
Sophomore	N=11	N=11	N=22
Junior	N=11	N=11	N=22
Senior	N=11	N=10	N=21
Total by Form	N=33	N=32	N=65

The following chapter contains a complete description of the preparation of materials for this study. Experimenter training, orientation procedures, and the collection of the data are also described in Chapter III.

CHAPTER III

PROCEDURES

Preparation of Materials

No local production was required for the films as they were purchased from the Teaching Research Division. Though filmed feedbacks were available, due to the cost involved and the data which indicated that negligible results seem to accrue from their use, this portion of the simulation materials was not implemented.

It had been originally proposed to have the E read a description of each episode to the St. Five judges, from the Washington State University Department of Education faculty, found it impossible to assess the scripts. They believed that audio-tapes should be used to hold the audio stimulus form constant rather than allow for disparity due to the vagaries of voice inflection and intonation. A second factor which was incorporated from the judges' suggestions was to tape the filmed children's voices whenever possible. After the audio-tapes were made, the judges were asked to evaluate the production quality in terms of four categories:

1. (More, Less) explanation of extraneous behaviors required
2. Conveyance of student(s) attitude
3. (More, Less) specific description of relevant student behavior needed, and
4. Miscellaneous

These recommendations were noted on a judging form (see Appendix C). The judges' evaluations were incorporated into the production of the revised audio-tapes. See Appendix C for a copy of the transcriptions for both audiotape sets, i.e., training and testing sets. To facilitate the St's perception of the episode setting, several seating charts were prepared to better describe the classroom arrangement which was the focal point of the simulation episodes (see Appendix C).

The materials necessary for the orientation of all Sts included a slide-tape presentation, a description of the school and community, a film presentation, and a seating chart of the most common arrangement for the simulated classroom. All of those materials were made available by the Teaching Research Division.

A Likert-type attitude scale was devised using a technique described extensively by Edwards (1957). A complete description of the scale's construction and a copy of the instrument are shown in Appendix B.

Experimenter Training

To establish a reliability estimate, an additional E was used during the testing phase. Approximately 10 hours of training were provided the second E. Prior to any testing, both Es participated in four hours of testing with two Sts not involved in the experiment. An inter-rater correlation for response categorization was .88 and cue discrimination assessment was .85 using Pearson's product-moment formula (Wert et al. 1954, p. 83).

Orientation Prior to Training

During the first hour of the individualized training, each St completed a two-phase orientation. In the first phase the Sts were given a written description of the school and community, a seating chart of the simulated classroom, (see Appendix E), and a slide-tape and film presentation to acquaint them with the simulated students. During the film presentation, all Sts were asked to role-play an introduction of themselves to the simulated class. The Sts were then given an opportunity to discuss any of the students with the E.

During the second phase of the orientation, the St was appraised of his particular training program. The St was told how to state his responses, how to state his assessment of the problem cues, and the role that the E would play in presenting prompts and feedback.

Data Collection

Training Format

Following their orientation to the class and their training program, the Sts were told to begin reading a short paragraph describing the episode they were about to observe--visually or aurally. The E jotted down the time the instruction began for the episode.

The episode description the St read usually contained information such as the number of children with whom he would deal, the subject matter being studied, the time of day, and where Mr. Land, the supervising teacher simulated by the stimulus forms, was located. The St then observed his respective stimulus situation (filmed or an oral description of the filmed setting). At whatever time the St chose to respond, he began the enacted response by speaking and/or initiating some physical response.

First responses (and all subsequent responses) were categorized and recorded by the E according to the standards (see Definition of Terms) assigned to that episode by Kersh (1963) during his developmental study. In some instances it was difficult to ascertain the St's intent; in those cases the E played the role of a student to force a more decisive response from the St. Appendix F contains an example of such a dialogue and a scoring matrix.

After the first response was given, the E provided the St with a verbalized feedback concerning the consequence of the St's response. This feedback reflected consequences suitable to the standards for that episode. A hypothetical dialogue is shown in Appendix F to exemplify that procedure.

The St was then asked what he saw or heard occuring in the episode (cue discrimination). As the St explained what he observed, the E compared his statement to the relevant cues listed in the simulation materials (Kersh, 1963). The E then recorded the number of cues that the St had stated. If the number given by the St was not consistent with the criterion listed then the E first asked "Did you notice anything else?" Should the St still not reach criterion, the episode was recycled. The St was questioned further until all relevant cues were acknowledged. The number of recyclings and E prompts were recorded.

If the first response was a type A, the St proceeded to the next episode. If not, then the St was recycled back through the response training segment until an A type response was given. Prompts by E were given to aid the St in achieving an appropriate response. The prompts were stated in terms of the behaviors identified by the standards for that episode, i.e., "Can you think of a response where you would deal sympathetically and confidentially with Wendy?" At the end of the episode the time was again noted by the E.

Fig. 9 is shown in Appendix F portraying the training format.

Training Measures

Determination of the effectiveness and efficiency of the various formats was accomplished by analyzing the training sheets (see Appendix D) for the following data:

1. First response scores
    a. The sum for the first-half of training (episodes 1-10)
    b. The sum for the second-half of training (episodes 11-20)
    c. The sum for the total training (episodes 1-20)
    d. The gain score for effectiveness (the sum for episodes 11-20 minus the sum for episodes 1-10)
2. Incorrect response scores
    a. The sum for the first-half of training
    b. The sum for the second-half of training
    c. The sum for the total training
    d. The gain score for efficiency (the sum for episodes 1-10 minus the sum for episodes 11-20)
3. Initial cue discrimination score
    a. The sum for the first-half of training
    b. The sum for the second-half of training
    c. The sum for the total training
    d. The gain score for effectiveness (the sum for episodes 11-20 minus the sum for episodes 1-10)
4. The sum of stimulus recyclings--an efficiency measure
5. E prompts for responses
    a. The sum for the first-half of training
    b. The sum for the second-half of training
    c. The sum for the total training
    d. The gain score for efficiency (the sum for episodes 1-10 minus the sum for episodes 11-20)
6. E prompts for cue discrimination
    a. The sum for the first-half of training
    b. The sum for the second-half of training
    c. The sum for the total training
    d. The gain score for efficiency (the sum for episodes 1-10 minus the sum for episodes 11-20)
7. Elapsed time in minutes
    a. The sum for the first-half of training
    b. The sum for the second-half of training
    c. The sum for the total training
    d. The gain score for efficiency (the sum for episodes 1-10 minus the sum for episodes 11-20)

Attitude Assessment

To ensure that the *St*s attitude toward the training was influenced by a perception dependent only on a particular stimulus form, a Likert-type attitude scale was administered immediately following the completion of training. Because the training and testing situations were individualized (each *St* worked in a one-to-one setting with the *E*) the opportunity for the *St* to remain anonymous was lost. To achieve a relatively high degree of validity, each *St* was assigned a number for his attitude scale. The *St*s were told that, because the training was also an experiment, an honest statement of their attitude was imperative. When the *St*s completed the scale, they were told to place the scale in a ballot box rather than return it to the *E*. The scale (see Appendix B) required approximately 20 minutes to complete.

Testing

The testing procedure required approximately one hour. To control for reliability, one of two *E*s was randomly assigned to an *St* within a given cell (see Table 1).

The *St*s were told that they would be tested over 20 episodes and that approximately one-half would be filmed episodes and the other one-half would be audio-taped episodes. They were told that they would be asked to respond to each episode as they had in training and that they would then be asked to assess the cues as they had previously done in training. It was emphasized that the *E* would provide no feedback during the testing session.

Because one-half of the total group was trained using films and the other one-half using audio-tapes, it was decided to begin the testing using a stimulus form which was the same as the one with which the *St* had been trained. This first episode became the placebo episode. All subsequent episodes were randomly chosen for their stimulus form, i.e., episodes 2, 3, 5, 9, 13, 15, 18, 19, and 20 were presented by film to all Sts with all the other episodes being presented by audio-tape.

As one of two sets of episodes were used for training, the set not used previously with a given St was used for testing that St. Past research had indicated that these two sets could be considered comparable (Twelker, 1966b; Kersh, 1963). To ensure greater control, though, Sts were randomly assigned to a specific set for training. Analysis of variance was performed to determine the validity of the assumption that the two sets were comparable. Because of the afore-mentioned research, set difference was not considered as an independent variable in the study design (see Table 2).

Testing Measures

Due to the varying stimulus forms, several testing measures were collected. The first two measures, response score and cue discrimination score, were considered indices of effectiveness. The testing measures and their components are enumerated below:

1. Response score
    a. The sum for oral stimulus episodes
    b. The sum for film stimulus episodes
    c. The sum for episodes 2-20 (total test minus the placebo episode)
    d. The sum for the total testing
2. Cue discrimination score
    a. The sum for oral stimulus episodes
    b. The sum for film stimulus episodes
    c. The sum for episodes 2-20 (total test minus the placebo episode)
    d. The sum for total testing
3. Elapsed time in minutes--an efficiency measure

Change Scores

Two types of change scores (training to testing) were computed, first response scores and initial cue discrimination. Both change scores plus their components are listed below:

1. First response score (the sum of testing minus the sum of training)
   a. Total difference for all episodes
   b. Difference for similar problem episodes[1]
   c. Difference for episodes with similar standards[2]
2. Cue discrimination
   a. Total difference for all episodes
   b. Difference for similar problem episodes

All of the measures identified in this chapter were examined by either a two- or three-way analysis of variance. The results of these analyses follow in the next section.

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[1] Those episodes classified as management or communication problems.

[2] Episodes in one set whose standards matched those of episodes in the second set.

CHAPTER IV

RESULTS

Analyses Used

The data collected for this study were examined through analysis of variance. A two-way analysis was applied to 38 measures using Lindquist's treatment by levels design (1956, pp. 121-141). Twenty other measures were treated by way of a three-dimensional analysis of variance design described by Lindquist (1956, pp. 220-230).

Each of the hypotheses and resultant sub-hypotheses are discussed in the same order as they appear in Chapter II. Following the discussion of the hypotheses is a reporting of the data collected to analyze any effects attributable to the experimenter or set differences.

Analyses of Hypotheses

First Response Score for Training

As the *St* watched and/or heard each of the 20 training episodes for the first time, his/her resultant response to that situation was categorized before any *E* prompts were given. (See Appendix F for a description of the categorization procedure.) The values assigned to each response category ranged from three, for those responses that matched the criterion, to zero, for those times when a *St* chose to make no response. This system made it possible to compare the mean first response scores of the various treatment groups. The mean first response score, considered a measure of effectiveness, is discussed for each of the following four sub-hypotheses.

First-half of training.--Mean first response scores were tabulated for the first 10 of the 20 total episodes. Table 3, below, shows the results of the analysis of variance. Apparently neither of the independent variables, stimulus form (audio-tape and film) or elementary education level (sophomore, junior, and senior), nor the interaction of level by form had any significant effect on the mean first response score.

TABLE 3

ANALYSIS OF VARIANCE SUMMARY FOR FIRST RESPONSE--FIRST-HALF OF TRAINING

Source[a]	df	MS	F
Level	2	4.879	0.493
Form	1	1.208	0.122
Level X Form	2	7.300	0.737
Within	59	9.902	
Total	64		

*p. < .05

[a] The first two sources listed refer to the level of elementary education training (sophomore, junior, and senior) and the training stimulus form (audio-tape and film). The source denoted as level X form is the interaction of the two independent variables which serve to provide the six cells shown in Table 2.

Second-half of training.--A mean response score for the last 10 of the 20 episodes was computed. What small amount of variation existed between levels in the first-half of training (episodes 1-10) became even less pronounced in the second-half (episodes 11-20). Table 4, below, shows a decreased F-ratio for levels from that presented above in Table 3, indicating less variation occurred.

TABLE 4

ANALYSIS OF VARIANCE SUMMARY FOR FIRST RESPONSE--SECOND-HALF OF TRAINING

Source	df	MS	F
Level	2	0.125	0.016
Form	1	11.502	1.449
Level X Form	2	12.260	1.545
Within	59	7.937	
Total	64		

$*p. < .05$

The comparability of the learning curves[1] for the training levels can be seen in Fig. 1, below. The mean differences, which do not exceed 0.78 for either the first- or second-half of training, indicate that on this measure level has little apparent influence on effectiveness (the height of the curve) or on efficiency (the slope of the curve).

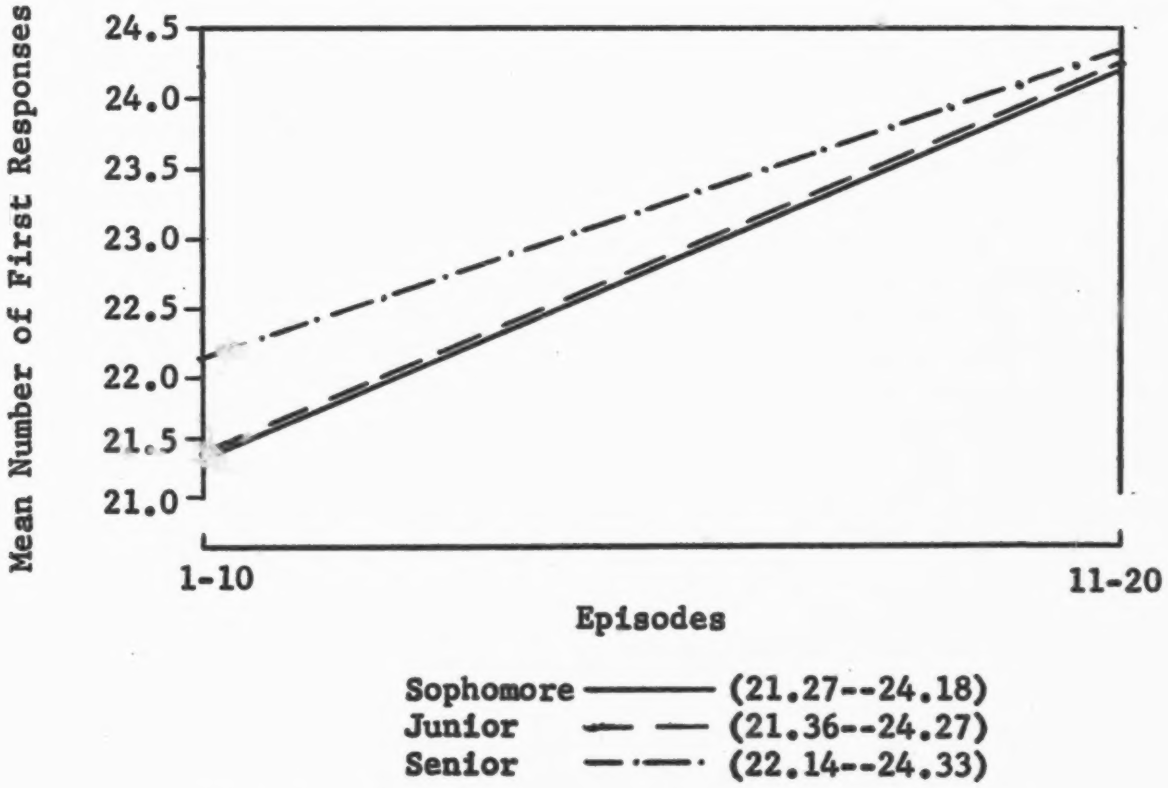

Fig. 1.--First response learning curves for training levels.

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[1] The learning curves presented in this paper are portrayed in a linear form for ease of comparison--they should not be viewed as exact replicas of the actual curves. They are to be viewed as figural representations only.

The differences in F-ratios in Tables 3 and 4 indicate that some variation in mean response scores between the first- and second-half of training may have occurred as a result of stimulus form. Fig. 2, below, indicates that the students trained via audio-tapes tended to exhibit a lower first-half mean score but increased their rate of learning when compared to the group trained by films. The absolute difference in the total mean first-response scores for the two stimulus form groups is so small (0.84) that, though this finding is interesting, it can not be considered statistically significant with the low F-ratios exhibited.

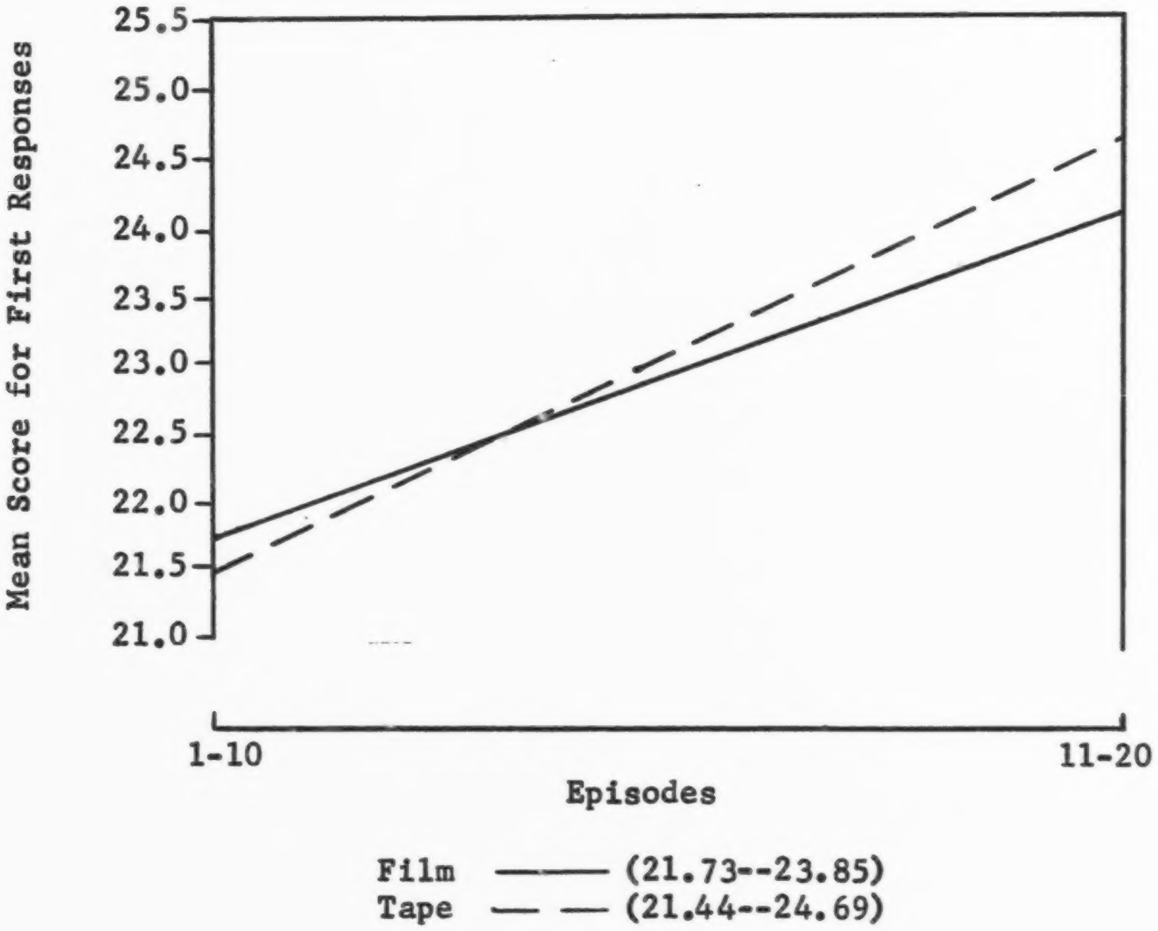

Fig. 2.--First response learning curves for stimulus forms.

Total training.--In view of the preceding data it was anticipated that the variations in mean first response scores would be non-significant. A three-way analysis of variance was used to examine level, form, and set as main effects plus their interactions. Set was incorporated into the design to examine the contention previously stated that the differences in the two sets of episodes would be negligible. Apparently, none of the main effects nor their interactions were influential in deriving significant differences in mean first-response scores for the total training. Table 5, below, shows the summary for the total training analysis of variance.

TABLE 5

ANALYSIS OF VARIANCE SUMMARY FOR
FIRST RESPONSE--TOTAL TRAINING

Source	df	MS	F
Level	2	6.339	0.272
Form	1	5.255	0.225
Set	1	5.371	0.230
Level X Form	2	5.409	0.232
Level X Set	2	2.221	0.095
Form X Set	1	5.264	0.226
Level X Form X Set	2	11.990	0.514
Within	53	23.333	
Total	64		

*p. $<$ .05

Gain score.--No significant differences were noted when the mean gain scores for the groups were compared. The gain score was acquired by subtracting the summed score of first responses for episodes 1-10 from those for episodes 11-20. The p. value associated with the F-ratio for levels was 0.829, indicating that the year, or level in education training, had a very limited influence on the amount of gain that students made in the second-half of training. Form and the interaction of level by form had p. values of 0.158 and 0.129, respectively, indicating more influential, yet non-significant, effects. The results of the two-way analysis of variance for the mean first-response gain score is shown in Table 6.

TABLE 6

ANALYSIS OF VARIANCE SUMMARY FOR
FIRST RESPONSE--GAIN SCORE

Source	df	MS	F
Level	2	2.775	0.189
Form	1	30.065	2.043
Level X Form	2	31.173	2.119
Within	59	14.714	
Total	64		

*p. $<$ .05

Number of Incorrect Responses Given During Training

Because this study was also directed at the efficiency of training as a result of stimulus form and level of elementary education training, the number of incorrect responses (those not matching the criterion) given before a correct response was achieved were summed. It was assumed that the least number of responses (errors) given would indicate which training method could be judged more efficient. Four sub-hypotheses were examined as a set of indices concerned with the efficiency of training.

If the St's first response to the stimulus did not meet the established criterion, the St was asked to continue giving responses (aided by E prompts and feedbacks) until a suitable response had been achieved. A sum of the incorrect responses which the St made was computed for episodes 1-10, 11-20, and a total for episodes 1-20. A gain score was derived by subtracting the sum for episodes 11-20 from the sum for episodes 1-10. Those analyses are discussed below.

Incorrect responses for the first-half of training.--A two-way analysis of variance indicated a significant difference due to the effect of level of elementary education training (p. $<$ .005). Form and the interaction effect of level by form were non-significant with p. values of 0.474 and 0.095, respectively. The summary for this sub-hypothesis is shown in Table 7.

TABLE 7

ANALYSIS OF VARIANCE SUMMARY FOR INCORRECT RESPONSES --FIRST-HALF OF TRAINING

Source	df	MS	F
Level	2	34.692	5.784*
Form	1	3.121	0.520
Level X Form	2	14.712	2.453
Within	59	5.998	
Total	64		

*p. < .05

To analyze the individual level mean differences, a significant t value was computed using Lindquist's formula for the "critical difference" (1953, p. 146). The results of that comparison are summarized below and are shown in Table 8.

TABLE 8

MEAN DIFFERENCES FOR INCORRECT RESPONSES FOR TRAINING LEVEL FOR THE FIRST-HALF OF TRAINING

Level	Sophomores	Juniors	Seniors	Mean Rank
Sophomores		2.09*	1.83*	1
Juniors			-0.26	3
Seniors				2

*A t value of 1.51 was the required mean difference to be significant to the .05 level.

The data in Table 8 indicate that the sophomores gave significantly more incorrect responses during episodes 1-10 than the other two levels. Juniors gave fewer incorrect responses than seniors though the difference was statistically non-significant.

Incorrect responses for the second-half of training.--The significantly greater number of incorrect responses made by sophomores in the first-half of training was not found in the second-half of training. Form and the interaction of level by form were, once again, non-significant. Table 9 provides a summary of the analysis of variance for this measure.

TABLE 9

ANALYSIS OF VARIANCE SUMMARY FOR INCORRECT RESPONSES--SECOND-HALF OF TRAINING

Source	df	MS	F
Level	2	6.872	1.501
Form	1	3.802	0.830
Level X Form	2	5.128	1.120
Within	59	4.579	
Total	64		

*p. < .05

The comparability of films and audio-tapes (the F-ratio for form had a p. value of 0.366) in eliciting incorrect responses during training is shown graphically in Fig. 3, below. The reduction in the mean number of incorrect responses is almost a constant ratio. The absolute mean differences of 0.42 responses for the first-half of training and 0.30 for the second-half of training are very slight.

The reduction curve which exhibits the steepest slope in Fig. 4, below, is that portraying the incorrect responses for sophomores. An absolute reduction of 4.50 incorrect responses was achieved by the sophomores, though this difference is somewhat tempered by the fact that their mean score for the first-half of training was significantly higher than that of either the juniors or seniors. The most interesting feature of Fig. 4 is that all

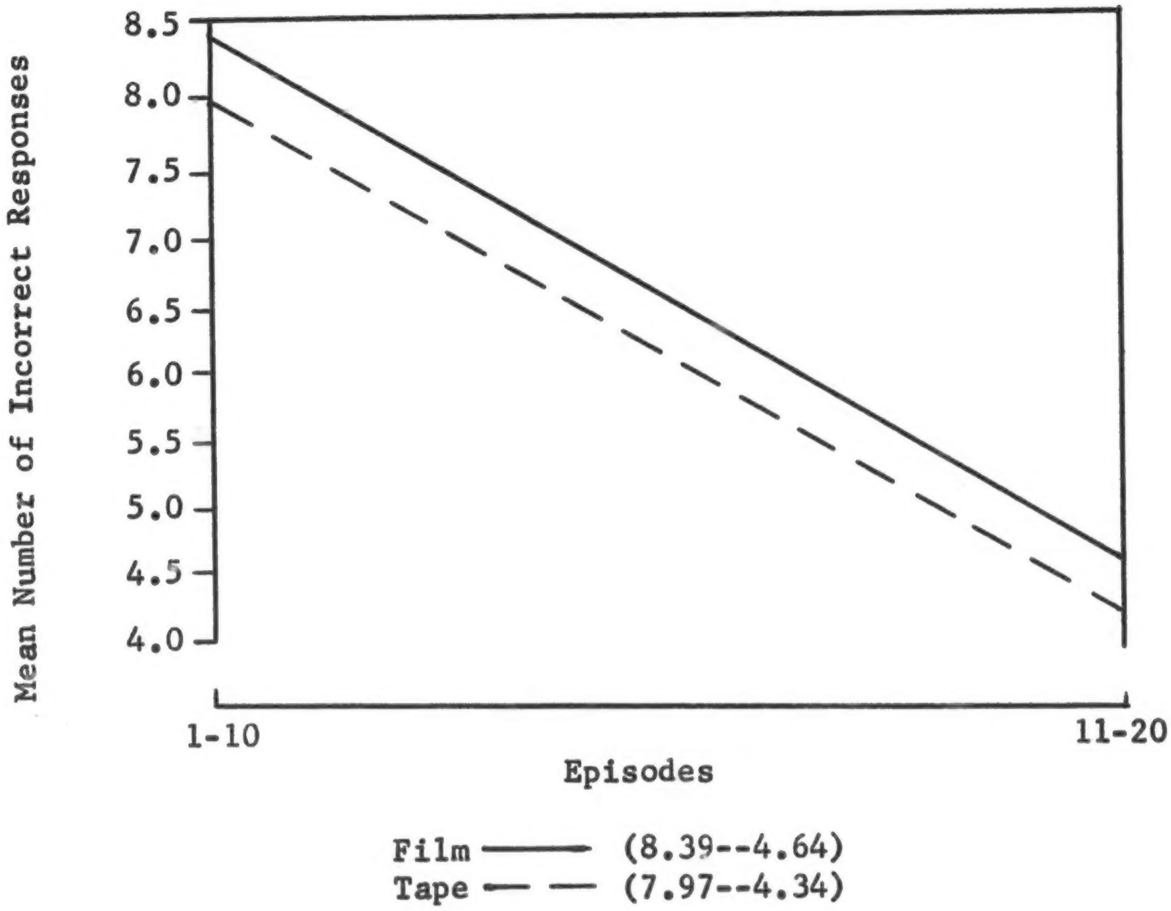

Fig. 3.--Incorrect response reduction curves for stimulus forms.

three training levels made approximately an equal number of incorrect responses during the second-half of training. Apparently, the group which benefited most from the first-half of training was the sophomores. Whether this benefit is attributable to their increased knowledge of how to respond to classroom management problems or to simulations of such problems is a question of validity not assessed in this study.

Incorrect responses for the total training.--A significant difference between levels (p. $<$ .009) was determined for the mean number of incorrect responses given during the total training (see Table 10, below).

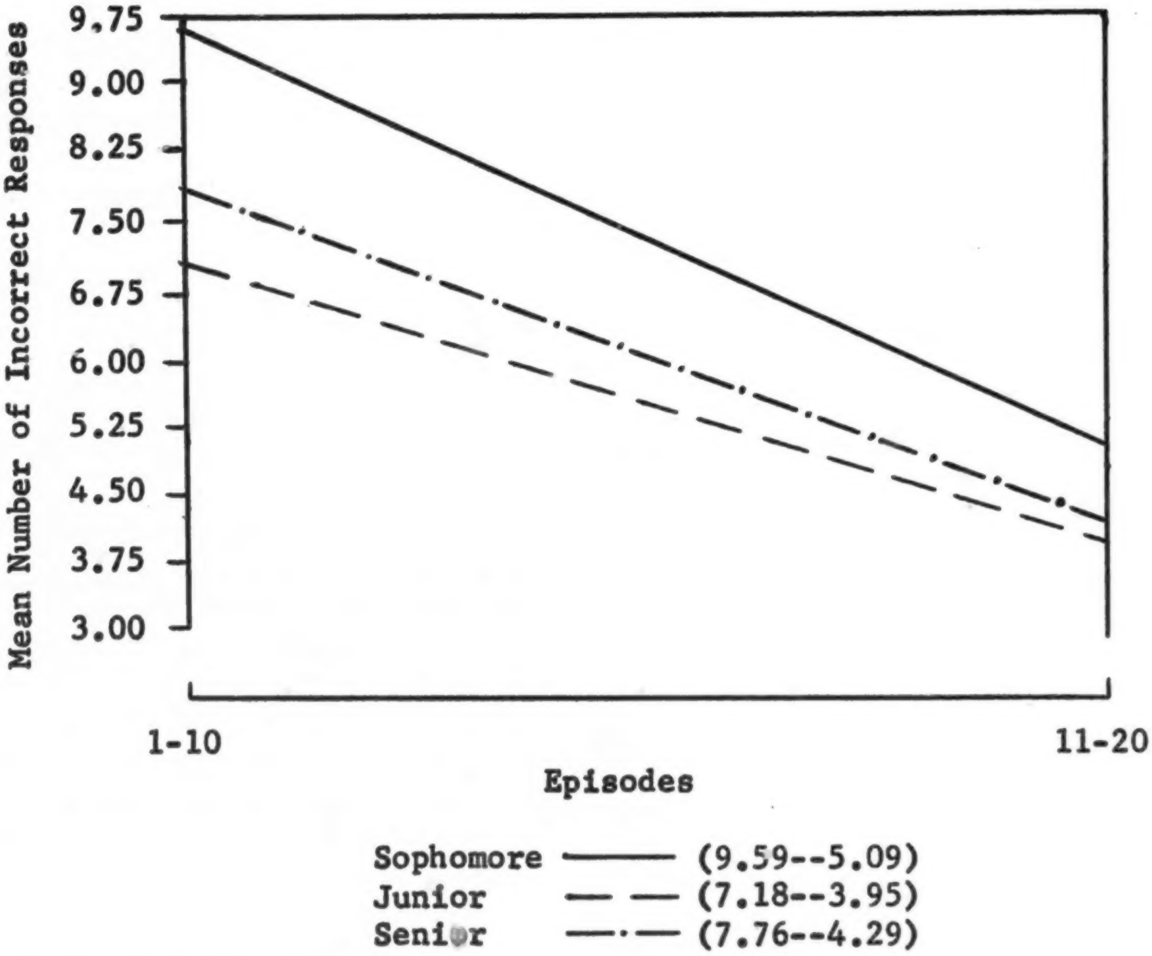

Fig. 4.--Incorrect response reduction curves for training levels.

The p. value for the F-ratios for form and for form by level were non-significant ($p. < 0.326$ and 0.528, respectively).

TABLE 10

ANALYSIS OF VARIANCE SUMMARY FOR INCORRECT RESPONSES--TOTAL TRAINING

Source	df	MS	F
Level	2	72.375	5.141*
Form	1	13.812	0.981
Level X Form	2	11.143	0.792
Within	59	14.077	
Total	64		

*$p. < .05$

The differences between the mean scores for the individual levels are summarized below in Table 11. This analysis confirms the trend indicating that sophomores made more incorrect responses than did the upperclassmen (juniors and seniors) while the difference between the means for the juniors and seniors was quite small.

TABLE 11

MEAN DIFFERENCES FOR INCORRECT RESPONSES FOR LEVEL FOR TOTAL TRAINING

Level	Sophomores	Juniors	Seniors	Mean Rank
Sophomores		3.50*	2.59*	1
Juniors			-0.91	3
Seniors				2

*2.32 was the required mean difference significant to the .05 level.

Incorrect response reduction score.--Both main effects were non-significant for the mean gain score for incorrect responses. As is indicated in Table 12, below, the interaction effect of form by level was significant ($p. < 0.032$).

TABLE 12

ANALYSIS OF VARIANCE SUMMARY FOR INCORRECT RESPONSES--REDUCTION SCORE

Source	df	MS	F
Level	2	9.230	1.253
Form	1	0.186	0.025
Level X Form	2	26.917	3.655*
Within	59	7.365	
Total	64		

*$p. < .05$

A comparison of the mean differences between individual cells for incorrect response reduction scores is shown in Table 13.

TABLE 13

MEAN DIFFERENCES FOR INCORRECT RESPONSES FOR INTERACTION--REDUCTION SCORES

Level X Form	So.-Film	So.-Tape	Jr.-Film	Jr.-Tape	Sr.-Film	Sr.-Tape	Mean Rank
So.-Film		1.45	1.54	2.36*	3.00*	0.28	1
So.-Tape			0.09	0.91	1.55	-1.17	3
Jr.-Film				0.83	1.46	-1.26	4
Jr.-Tape					0.64	-2.08	5
Sr.-Film						-2.72**	6
Sr.-Tape							2

*2.32 was the required mean difference, for a cell size of 11, significant to the .05 level.

**2.42 was the required mean difference, for a cell size of 10, significant to the .05 level.

It appears from the above data that significant mean differences are attributable to a greater decrease in incorrect responses made by the sophomores trained by films and the seniors trained by audio-tapes. This confusing trend may be explained somewhat by examining the first-half mean scores and the mean reduction scores for the six groups. This comparison is shown in Table 14.

TABLE 14

MEAN INCORRECT RESPONSE SCORES RANKED FOR FORM BY LEVEL

Level X Form	Mean First-Half Incorrect Response Score	Mean First-Half Incorrect Response Score Rank	Mean Reduction Score	Mean Reduction Score Rank
So.-Film	10.64	1	5.37	1
So.-Tape	8.55	2	3.73	3
Jr.-Film	7.36	4	2.63	5
Jr.-Tape	7.00	6	2.82	4
Sr.-Film	7.18	5	2.18	6
Sr.-Tape	8.40	3	4.90	2

The sophomore-film group made the most errors originally. Consequently, their score may have been the easiest to reduce. Those groups with the second- and third-highest mean scores for the first-half of training decreased their scores the third- and second-most, respectively. The bottom three groups in the number of incorrect responses made in the first-half of training were still ranked in the bottom half for reduction scores. Apparently, the significant interaction effect for this measure is a result of a high mean for incorrect responses for the first-half of training. The sophomore-film group, ranked one for the first-half of training, had a significantly different reduction score when compared with junior-tape and senior-film, ranked five and six, respectively, for the first-half of training. The senior-tape, ranked three in the first-half of training, was significantly different from the mean reduction score for senior-film, ranked five for the first-half of training.

Initial Cues Discriminated During Training

After the St had given his first response to the stimulus situation, the E provided a verbalized feedback describing the consequence of that response. The St was then asked to recall what he had heard and/or seen in that episode. As the St related that information, the E compared the St's description to a list prepared for that (and every other) episode by Kersh (1963). The number of items which the St related, before any E prompting, which matched those identified by Kersh, became the cue discrimination score.

The mean number of cues discriminated for the first-half, the second-half, and the total training as well as a gain score were calculated. The results of the analyses of these measures follows.

First-half of training.--A two-way analysis of variance revealed no significant difference for the main effects (p. for level <0.719 and for form p.$<$ 0.573). The interaction of form by level was also non-significant (p. $<$ 0.838). Apparently, the mean scores for cue discrimination were influenced non-significantly by either stimulus form or class level for the first-half of training. A summation of the analysis for this measure is shown in Table 15.

TABLE 15

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION FOR TRAINING--FIRST-HALF

Source	df	MS	F
Level	2	3.375	0.332
Form	1	3.269	0.322
Level X Form	2	1.796	0.177
Within	59	10.159	
Total	64		

*p. $<$ .05

Second half of training.--No significant differences were found for the mean number of cues discriminated during the second-half of training. Table 16 shows the summary for the two-way analysis of variance for that measure. The F-ratio for form had a p. value of 0.057. The means for the film and audio-tape training groups were 11.76 and 12.66, respectively. This indicated that either cues may have been slightly easier to discriminate using the audio-tape method, or that the Sts trained via films were not as successful in learning to identify cues.

Total training.--The differences in mean scores for initial cue discrimination were analyzed by a three-way analysis of variance. Differences attributable to set were added to the usual main effects of level and form.

TABLE 16

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION FOR TRAINING--SECOND-HALF

Source	df	MS	F
Level	2	4.633	1.358
Form	1	12.906	3.784
Level X Form	2	0.501	0.147
Within	59	3.411	
Total	64		

*p. < .05

The results shown in Table 17 indicate that the effects of form and of set were significant. A confounding or complicating factor in the differences which might be associated with set effect is the fact that Kersh (1963) identified 33 cues to be discriminated for set I and 35 cues for set II. The magnitude of the influence that the unequal number of cues may have had is speculative, though an important consideration.

TABLE 17

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION FOR TRAINING--TOTAL

Source	df	MS	F
Level	2	3.828	0.383
Form	1	63.909	6.396*
Set	1	158.809	15.893*
Level X Form	2	0.418	0.042
Level X Set	2	9.966	0.997
Form X Set	1	10.735	1.074
Level X Form X Set	2	2.145	0.215
Within	53	9.992	
Total	64		

*p. < .05

The mean for the film group was 24.88 and the audio-tape group mean was 26.88. Because one-half of each group was trained using each of the two sets, this difference was not confounded by the unequal number of cues to be discriminated.

The mean scores for the two sets were 24.36 for set I, the set with 33 cues, and 27.41 for set II--35 cues. In light of the confounding effect, this difference may be misleading though its p. value of 0.001 is certainly statistically significant. A t value of 1.58 was required for a significant difference between those two means. With the difference of two cues to be discriminated and a mean difference only 3.05, the significance level exhibited is statistically significant, but may exist as a result of bias attributable to the number of cues.

Gain score.--The gain score effects for form, level, and form by level were all non-significant. This is not a surprising result in light of the fact that set I had three less cues to be discriminated for the second-half of the episodes and set II had one less. Though this is not an argument against the lack of significance, it is certainly a more telling argument against an active support of a null proposition for this sub-hypothesis.[2]

Stimulus Recyclings

If an St was unable to assess the problem cue(s)[3] even with the aid of E prompts, the episode was recycled, i.e., the audio-tape or film was replayed. Assuming that training was expedited when fewer recyclings were necessitated, a two-way analysis of variance (e.g., Table 18) aided in the determination that the audio-tape training was more efficient ($p. < 0.001$).

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[2] In those cases where the analysis of variance summary table is not shown, the table can be found in Appendix A under the same label as the title for the section under discussion. Summary tables for hypotheses are provided in the first section of Appendix A.

[3] For some episodes only one cue was listed, or an St may have identified only one cue correctly in an episode with multiple cues.

The mean number of recyclings required for the audio-tape groups was 0.28, or about one-fifth that of the mean for the film group, 1.42.

TABLE 18

ANALYSIS OF VARIANCE SUMMARY FOR TRAINING STIMULUS RECYCLINGS

Source	df	MS	F
Level	2	0.053	0.036
Form	1	21.294	14.523*
Level X Form	2	1.922	1.311
Within	59	1.466	
Total	64		

*p. < .05

Response Prompts

If an St's first response to an episode failed to meet the criterion established, the E provided prompts and feedbacks for other responses. The number of prompts (including E feedbacks) provided the St were summed for each episode. The mean number of prompts for the first- and second-half of training and the total training were calculated. A decrease in E prompts from the first- to the second-half of training was considered a measure of efficiency. To analyze the efficiency of the various training groups, a reduction score was tabulated by examining the mean difference between the first- and second-half of training.

First-half of training.--The sophomores required more response prompts during the first 10 episodes than did the upperclassmen. This difference for level was initially indicated by the significant F-ratio reported below in Table 19. The other main effect, form, was non-significant as was the interaction effect, although the p. value associated with the latter effect's F-ratio was 0.089.

TABLE 19

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE PROMPTS--FIRST-HALF

Source	df	MS	F
Level	2	67.808	4.367*
Form	1	0.024	0.002
Level X Form	2	39.125	2.520
Within	59	15.528	
Total	64		

*p. < .05

An analysis of the means for training levels (see Table 20) revealed that the differences between sophomores and juniors and seniors for response prompts were statistically significant. The difference between the means for the juniors and seniors was quite slight with seniors requiring slightly more prompts to reach a criterion response during the first-half of training.

TABLE 20

MEAN DIFFERENCES FOR RESPONSE PROMPTS FOR TRAINING LEVEL--FIRST-HALF

Level	Sophomores	Juniors	Seniors	Mean Rank
Sophomores		3.09*	3.01*	1
Juniors			-0.08	3
Seniors				2

*2.44 was the required mean difference significant to the .05 level.

Second-half of training.--Neither of the two main effects nor the interaction effect was significant for the mean number of E prompts required during the second-half of training. The p. value associated with level was 0.577, with form it was 0.665, and with level by form it was 0.421, indicating more homogeneity in the number of prompts necessary than in the first-half of training.

Total training.--No significant effects were noted in analyzing the total number of E prompts given in the total training. A p. value of 0.064 associated with level indicated that probably the earlier differences in the first-half of training influenced the total training score, though non-significantly. Form had a p. value of 0.625 and the p. value for interaction was 0.623.

Reduction score.--Once again none of the effects for the reduction scores were statistically significant (p. values were 0.117 for level, 0.598 for form, and 0.749 for interaction). The first- and second-half data shown in Fig. 5, below, indicate that, though the sophomores were initially more inefficient to train, they became considerably less dependent on E prompts in the second-half of training. The upperclassmen revealed a negligible difference between their mean prompting scores, requiring practically the same number of prompts to reach a satisfactory response.

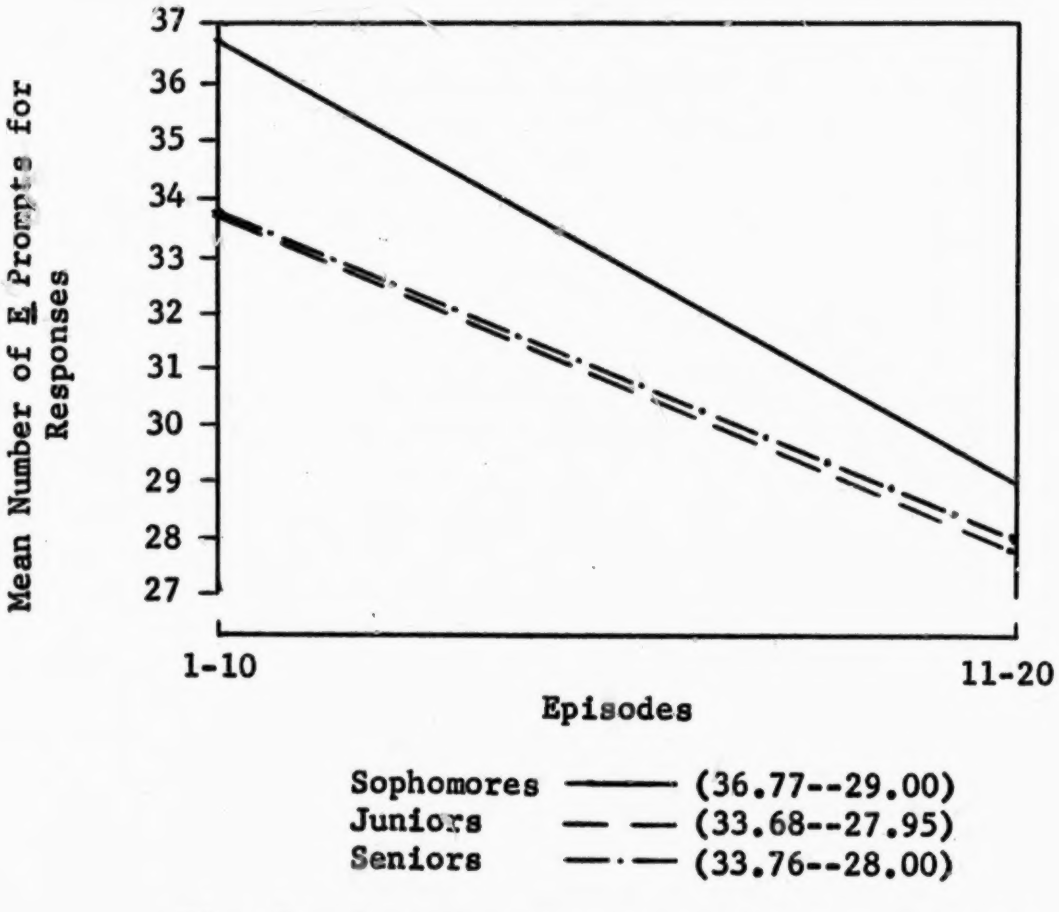

Fig. 5.--Response prompt reduction curves for training levels.

Cue Discrimination Prompts

When the E had finished providing the St with a feedback to the initial response for an episode, the St was then asked what occurred in that problem situation. If the St was unable to identify all the relevant cues listed by Kersh (1963), the E began to provide prompts. (See the section Training Procedures in Chapter III or Appendix F for a complete description of the prompting procedure.) The sum of these prompts was tabulated for the first- and second-half of training and the total training. An efficiency measure was acquired by subtracting the total number of prompts for the second-half of training from that of the first-half. Each of those four measures was examined via a two-way analysis of variance.

First-half of training.--The usual main effects of level and form were used to analyze the results of the mean number of cue discrimination prompts. The interaction F-ratio was non-significant ($p. < 0.389$) as was the ratio for level ($p. < 0.643$). A p. value of 0.016 was associated with the treatment effect for form. Those students trained via films required a mean of 16.52 prompts while the audio-tape group required 14.64 prompts. A summary of the analysis of variance for the first-half prompts is shown in Table 21.

TABLE 21

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION PROMPTS--FIRST-HALF

Source	df	MS	F
Level	2	4.028	0.444
Form	1	55.336	6.104*
Level X Form	2	8.689	0.959
Within	59	9.065	
Total	64		

*p. < .05

Second-half of training.--None of the F-ratios were significant for the main effects or for interaction. The p. value associated with form was 0.109, indicating somewhat less fluctuation occurring in mean differences for the cue discrimination prompts. This closer approximation to comparability in the film group and audio-tape mean scores is reflected in the slope differences shown in Fig. 6.

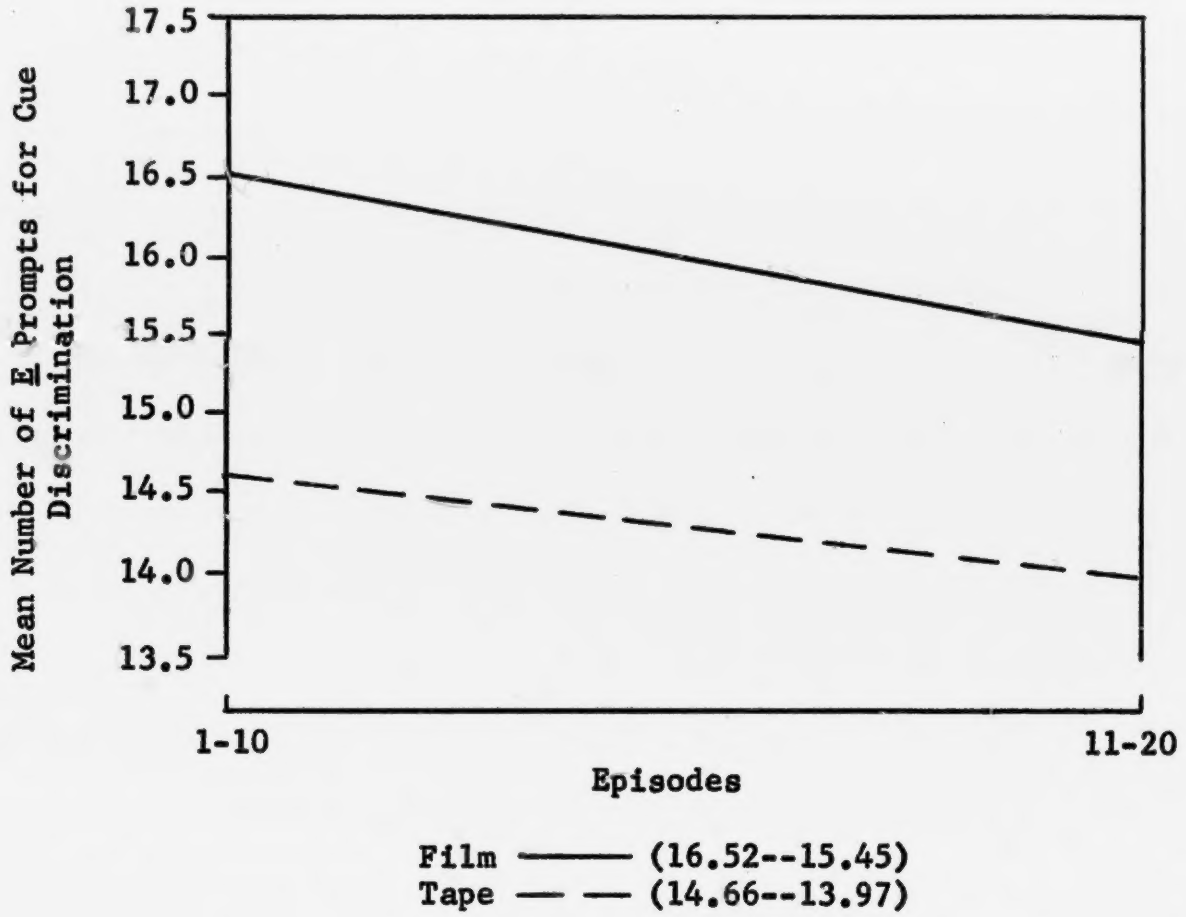

Fig. 6.--Cue discrimination prompt reduction curves for stimulus forms.

Total training.--The F-ratio associated with form (see Table 22) had a p. value of .006 for the total training measure. The number of E cue discrimination prompts necessary for the St to achieve criterion during the total training seemed to be a result of the stimulus form. (Level and interaction lacked significant effects with p. values of 0.626 and 0.459, respectively.) Those students trained with films required 2.80 more prompts than did the audio-tape trained students (i.e., films required 31.36 prompts and audio-tapes 28.56 prompts during the total training). This result indicated that simulation training using films was less efficient than the use of audio-tapes.

TABLE 22

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION PROMPTS--TOTAL TRAINING

Source	df	MS	F
Level	2	7.227	0.471
Form	1	125.632	8.193*
Level X Form	2	12.108	0.790
Within	59	15.334	
Total	64		

*p. < .05

Reduction score.--Though form had had an influential effect for the first-half of training and the total training, it was a non-significant effect as a reduction score (p. < 0.296). The effects for level (p. < 0.721) and interaction (p. < 0.354) also lacked statistical significance.

Elapsed Time

As the St began reading the situation description for a new episode for training or testing, the E wrote down the time to the nearest minute. After each episode was finished, the time was again noted. This procedure made it possible to calculate the average number of minutes required for the first- and second-half of training as well as for the total training. By subtracting the time necessary for episodes 11-20 from that for episodes 1-10, a reduction score for each St was achieved. All these measures were considered measures of training efficiency.

Calculations were also made for the mean time required for testing as a result of training level or form. A reduction score was determined by subtracting the time required for testing from that for training for each St.

First-half of training.--The differences in training time required for episodes 1-10 were non-significant. The p. value associated with level was 0.339, with form it was 0.569, and with level by form it was 0.181.

Second-half of training.--Table 23 indicates that effect of interaction was significant (p. < 0.014) for the time required for episodes 11-20. Level had a p. value of 0.404 and that for form was 0.139. An examination of the data in Table 24 presents rather mixed results. The ranking of the mean times shows that the groups trained with films were ranked 1, 2, and 6 in total time while the audio-tape groups were ranked 3, 4, and 5. Generally, audio-tape training required less time for the second-half of training (with the exception of the junior-film group) as evidenced by the lower standing in the ranking for the three audio-tape groups. This trend is not, though, one that elicited significant differences (e.g., Table 23).

TABLE 23

ANALYSIS OF VARIANCE SUMMARY FOR ELAPSED TRAINING TIME--SECOND-HALF

Source	df	MS	F
Level	2	15.567	0.920
Form	1	37.979	2.244
Level X Form	2	77.135	4.558*
Within	59	16.923	
Total	64		

*p. < .05

TABLE 24

MEAN DIFFERENCES FOR ELAPSED TRAINING TIME--SECOND-HALF

Level	So.-Film	So.-Tape	Jr.-Film	Jr.-Tape	Sr.-Film	Sr.-Tape	Mean Rank
So.-Film		4.27*	5.18*	2.45	1.45	4.57**	1
So.-Tape			0.91	-1.82	-2.82	0.30	4
Jr.-Film				-2.73	-3.73*	-0.61	6
Jr.-Tape					-1.00	2.12	3
Sr.-Film						3.12	2
Sr.-Tape							5

*3.50 and **3.68 were the required mean differences for cell sizes of 11 and 10, respectively, which would be significant to the .05 level.

Total training.--No differences were significant for the total training time. A p. value of 0.096 for the effect of interaction was derived. The juniors trained with films were most efficient with a mean training time of 66.73 minutes; the sophomores trained with films were most inefficient with a mean time of 76.46 minutes to complete the total training.

Reduction in training time.--The differences for the sub-groups in reducing training time were non-significant. The p. value for level was 0.811, for form it was 0.491, and for interaction it was 0.716.

An examination of the following two figures reveals that, though the differences in training time tended to be either non-significant or confusing, there were two generalizations which might be drawn. Fig. 7 indicates that sophomores tended to take more time in the first-half of training than did the upperclassmen, but their scores could be considered comparable during the second set of 10 episodes. The sophomores could apparently be trained nearly as efficiently as the upperclassmen after a "breaking-in" period.

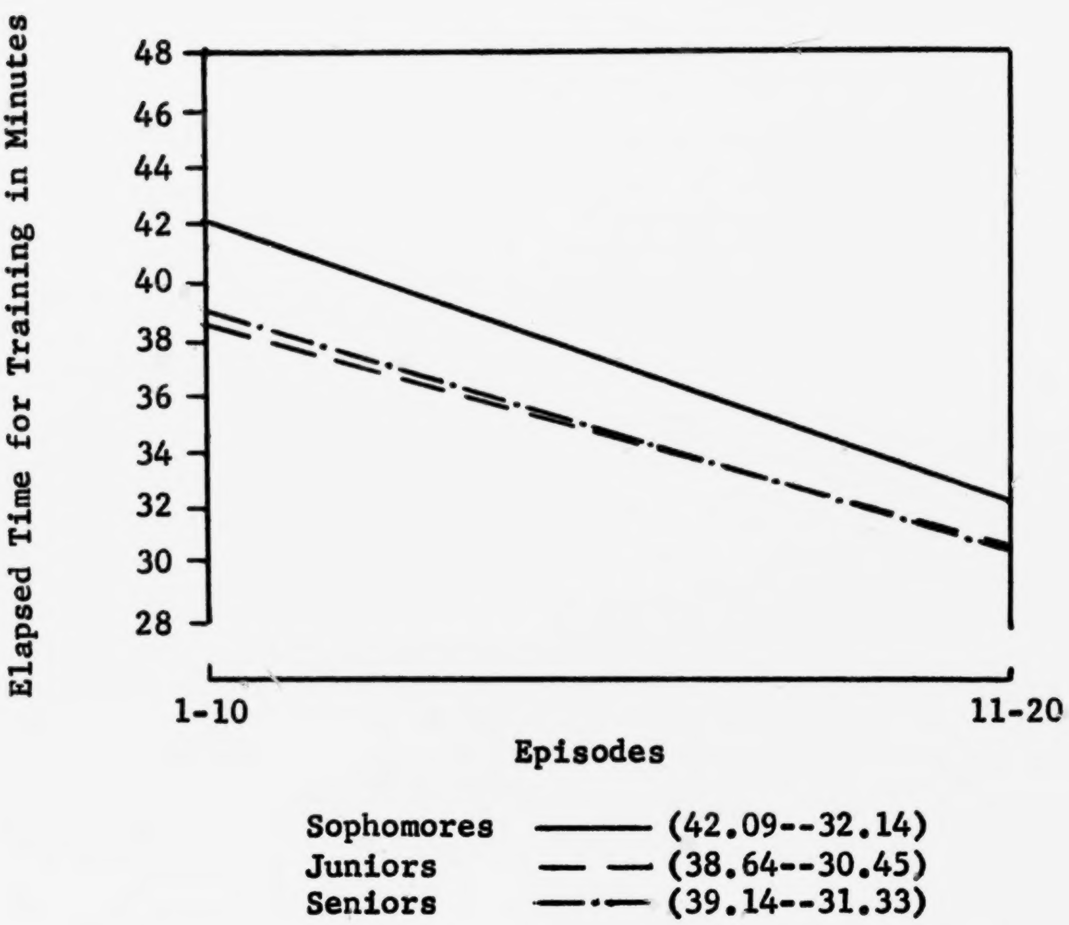

Fig. 7.--Elapsed time reduction curves for training levels.

Apparently, the audio-tape group required less time to train for either half of training. Fig. 8 shows that almost three and one-half more minutes were required to train the Sts using films for the first-half of training. This difference fell to approximately one and one-half minutes for the second-half of training.

These two differences attributable to form and level are interesting trends about which speculation might occur. Further discussion is hindered, though, in view of the lack of statistical significance exhibited by the variables of form and level.

Total testing.--Neither the effect for level (p. $<$ 0.177) or interaction (p. $<$ 0.501) was significant in analyzing the amount of time spent in testing. The difference associated with form was significant (see Table 25) with a corresponding p. value of 0.010. Those Sts trained via films required

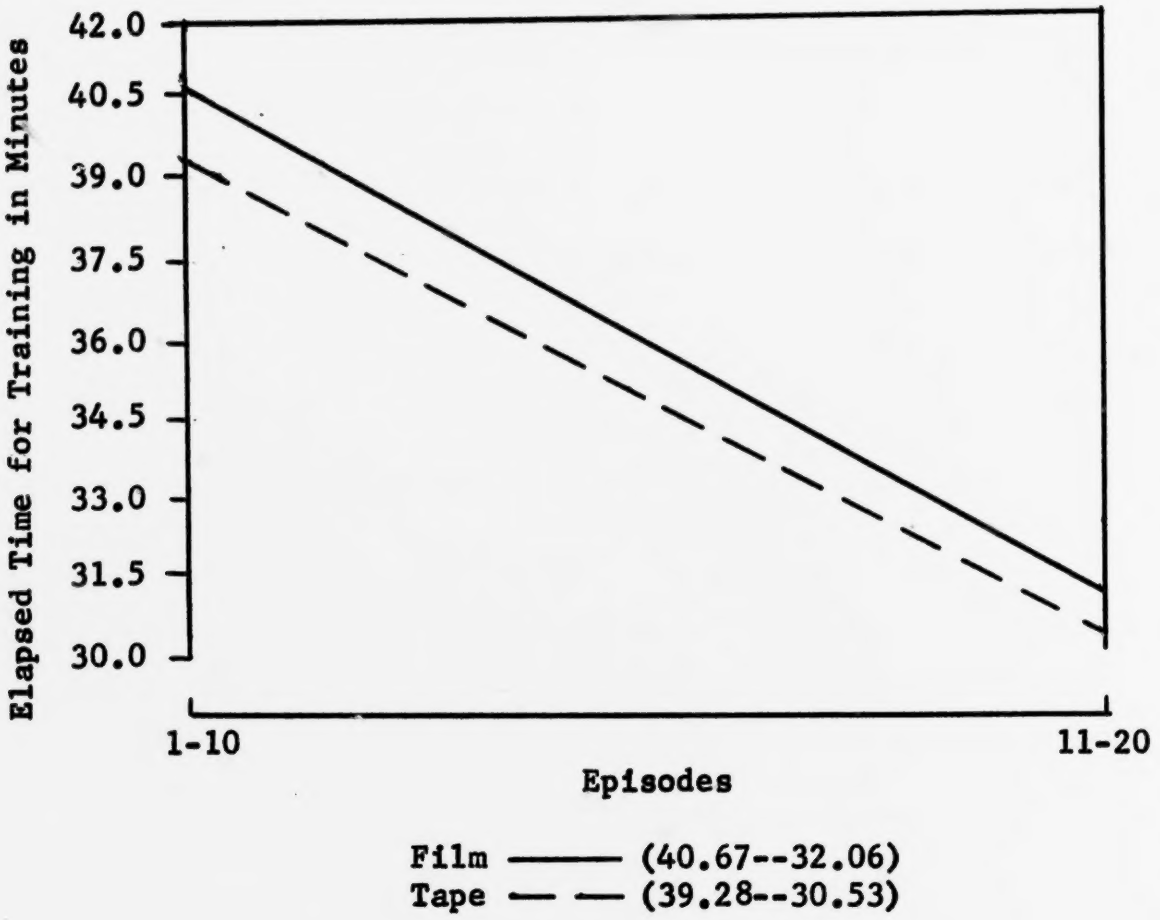

Fig. 8.--Elapsed time reduction curves for stimulus forms.

41.52 minutes to complete the 20 test episodes while the audio-tape trained Sts needed only 36.28 minutes to complete the test.

TABLE 25

ANALYSIS OF VARIANCE SUMMARY FOR ELAPSED TESTING TIME

Source	df	MS	F
Level	2	108.260	1.782
Form	1	431.585	7.104*
Level X Form	2	42.535	0.700
Within	59	60.756	
Total	64		

*p. < .05

Reduction in testing time.--The main effects and the effect for interaction were all non-significant in an examination of the amount of decrease in the time taken for testing as opposed to that for training. This indicates that no generalization could be drawn as to which group(s) became most efficient during testing when compared to training.

Response Score for Testing

During the testing situation the St was told to make only one response to each episode. No E prompts or feedbacks were given. The response made by the St was categorized using the same procedure described for training (e.g., Appendix F).

To test the effects of the two training stimulus forms (films and audio-tapes) both forms were used in the test. A response score was computed for the 10 episodes presented by audio-tape and for the nine episodes presented by film. The first episode was presented in the stimulus form that matched the St's training form, i.e., if the St was trained with films the first test episode was presented by film and vice versa. A sum for response scores was computed for the total testing minus the placebo episode, i.e., only episodes 2-20. The above three measures were examined by way of a two-way analysis of variance.

A fourth measure for total testing was computed by summing the response score for all 20 episodes (2-20 plus the placebo episode). The fourth measure of training effectiveness was analyzed via a three-way analysis of variance.

Audio-tape episodes.--The usual effects of level, form, and their interaction revealed no significant differences in response scores for episodes presented aurally. The lowest p. value of 0.108 was associated with training level. The mean response score for sophomores was 22.77, for juniors it was 24.41, and for seniors it was 23.19. Apparently, the upperclassmen responded to audio-tape episodes more effectively than the sophomores and juniors slightly more effectively than seniors. These conclusions must be taken lightly because of the lack of statistical significance exhibited by the effect of level.

Film episodes.--All the effects were non-significant for test response scores calculated for those episodes presented by film. The lowest p. value of 0.103 was associated with the interaction effect, not the main effect of level as was previously noted for audio-tape episodes. The individual cell means (see Table 26) reveal slight differences. Ranking the mean scores did not help to provide any conclusion regarding this measure.

TABLE 26

MEAN TEST RESPONSE SCORES FOR FILM EPISODES--BY CELLS

Cell	Mean Response Score	Mean Response Score Rank
So.-Film	21.18	2
So.-Tape	19.64	6
Jr.-Film	20.46	4
Jr.-Tape	23.18	1
Sr.-Film	20.27	5
Sr.-Tape	20.60	3

Total test minus the placebo episode.--Both main effects as well as that for interaction was non-significant for the response scores for episodes 2-20. A p. value of 0.065 for level indicated some differences due to elementary education training level. The sophomores achieved a mean of 43.36, the juniors 46.23, and the seniors 42.76. This rather surprising, yet non-significant result, indicated that the seniors achieved a lower response score on the last 19 test episodes than did either the sophomores or seniors.

When the influence of the E effect was examined, which is discussed in greater detail later in this chapter,[4] via a two-way analysis of variance, the differences attributable to elementary education training level became significant ($p. < 0.042$). Four other analyses were performed to examine the response scores for episodes 2-20 using form, set, and E as the main effects.[5] In three of those analyses, form contributed a significant effect. The effect attributable to E was also significant for one of those analyses. (See Appendix A, Tables 52, 53, 54, 55, and 68 for the summary of those five analyses of the response score for the total test minus the placebo episode.)

Total test response scores.--A third main effect, set, was added to the usual effects of level and form. A three-way analysis of variance indicated that the main effects of level and set had significant F-ratios (see Table 27). With a critical difference of 2.76 required for a .05 significance level, the juniors were found to be the group which differed most in total test responses. The juniors' mean of 48.77 was 3.13 and 5.15 points higher than the sophomores and seniors, respectively. The sophomores again did somewhat better than the seniors with a mean of 45.64 against that of 43.62 for the seniors.

The significant effect attributed to set ($p. < 0.001$) was unexpected. After noting no significant differences attributable to set for the first training responses (see Table 5), this effect was puzzling. An analysis of the individual St responses on the test for each episode indicated that some kinds of problem situations tended to be more difficult in both sets. When

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[4] See p. 72 for a complete analysis of E effect.

[5] See p. 72.

TABLE 27

ANALYSIS OF VARIANCE SUMMARY FOR TOTAL TEST RESPONSE SCORES

Source	df	MS	F
Level	2	76.521	3.843*
Form	1	12.443	0.625
Set	1	434.260	21.808*
Level X Form	2	10.992	0.552
Level X Set	2	37.690	1.893
Form X Set	1	0.181	0.009
Level X Form X Set	2	15.240	0.765
Within	53	19.913	
Total	64		

*p. < .05

the episodes were ranked, it was found that the five most difficult in set I were communication problems.[6] For set II, four of the five most difficult were also communication problems. However, set II had more communications problems (13) than did set I (11). Some apparent difference in problem difficulty was operating to cause the difference in mean response scores as a result of sets used in the test, i.e., set I had a mean of 42.08 and set II had a mean of 49.25. What specific factor(s) operated to cause that difference is presently unknown.

Five additional analyses were also performed on the total test response score. Significant differences were indicated for form in Tables 56, 58, and 59; for level in Table 69; for E in Table 58, 59, and 69; and, the interaction of set and E in Table 56.[7]

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[6] See Appendix F for a discussion of communication problems.

[7] All the tables listed are shown in Appendix A.

Cue Discrimination Score for Testing

Once the response to a test episode had been given, the E then asked the St to relate what he had seen and/or heard in that situation. As the St responded to that question, the E compared the cues discriminated to a list of cues prepared for each episode by Kersh (1963). A cue discrimination score was summed for the episodes presented via audio-tape, by film, and for the total test minus the placebo episode. Each of those measures was analyzed by a two-way analysis of variance. A measure for the total cues discriminated (episodes 1-20) was analyzed by a three-way analysis of variance. The results of these analyses are discussed below.

Audio-tape episodes.--The differences in the cue discrimination scores which may have resulted from training level or form proved to be statistically non-significant. The effect due to interaction also lacked significance.

Film episodes.--No statistically significant differences were determined for either main effect or the interaction of level by form for episodes presented visually. The p. values ranged from 0.417 for interaction to 0.677 for level. This indicated that the mean differences for the cue discrimination score seemed to be negligibly influenced by training format when film test episodes were examined.

Total test minus the placebo episode.--Cue discrimination scores for the last 19 test episodes were not significantly influenced by the various training treatments. The p. values ranged from 0.490 for level to 0.689 for form. Five additional analyses were used to examine this measure.[8] All five revealed significant differences attributable to E as a main effect. Summary

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[8] See p. 72.

Table 62 indicates that the interaction of form by E was significant when only the data for the seniors were used. Tables 60, 61, 62, 63, and 70, shown in Appendix A, all indicate that there were significant differences for this measure.

Total Test.--A three-way analysis of variance indicated no statistically significant differences due to the main effects of level, form, and set or their interactions. When the five additional analyses (see p. 72) were performed the main effect of E contributed to significant differences for each analysis. Form, as a main effect, was significant on one measure (e.g., Table 64) and, as an interaction effect, it was significant once (e.g., Table 66). The remaining three analyses, shown in Appendix A as Tables 65, 67, and 71, contained significant effects resulting from E variation. The results of all these analyses are confounded or complicated, as were those for training,[9] because the two sets of episodes did not have an equal number of cues to be discriminated. The p. values for this analysis ranged from 0.284 for set to 0.884 for the interaction of level by set.

Response Change Scores

In an attempt to determine if any significant differences in St responses would accrue as a result of training format, three change scores were computed and analyzed.

Similar problem episodes.--Two categories were used by Kersh in grouping the episode types--communication problems and management problems (see Appendix F). Eight pairs of episodes were found in the two sets that matched in terms of episode category type and the number of cues to be discriminated. The sum of each St's responses for the episodes 1, 2, 3, 4, 5, 6, 8, and 12 in set I were compared to the sum for episodes 1, 5, 6, 7, 8, 9, 15, and 17 in set II. If the St had been trained using set I, that score was subtracted from the score for the eight matching episodes in set II. An opposing procedure was used for Sts trained with set II. The change score derived from this calculation, defined as a measure of effectiveness, was examined via a two-way analysis of variance.

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[9] See pp. 50-51 for a discussion of the confounding due to an unequal number of cues to be discriminated for the two sets.

The main effects of level and form and their interaction did not provide any indication of significant differences when comparing similar problem episodes. Apparently, neither elementary education training level nor stimulus form had more than negligible effects in light of the high p. values attributed to each ($p. < 0.718$ and 0.608, respectively). The interaction of level by form had a p. value of 0.662, further verifying the conclusion that the independent variables were of only a limited influence.

Similar standard episodes.--Within each set, three pairs of episodes were found which had the same standards.[10] One member of each pair was in the first-half of training and the other member was in the second-half of the training episodes. For the Sts trained with the first set, a sum was computed for the first three episodes (3, 8, and 10) in set I and for the second three episodes (14, 15, and 16) in that set. By subtracting the sum of the first-half episodes from those of the second-half, matching episodes, a measure of effectiveness was acquired for set I. The pairs for set II (episodes 2, 4, and 5, and 13, 15, and 20) were compared in the same manner for each St trained by that set.

A two-way analysis of variance for that measure revealed no significant differences attributable to level, form, or their interaction.

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[10] See Definition of Terms for a discussion of the episode standards.

Total change scores.--The sum of the first responses for training were subtracted from the response score for testing. The differences (the total change score) were examined by two-way analysis of variance to determine the characteristics of this measure of effectiveness. No significant differences were attributable to the main effects of level and form or their interaction. Because of the great importance of this measure, the means for the cells, levels, and forms have been calculated and are shown in Table 28.

TABLE 28

MEANS FOR TOTAL RESPONSE CHANGE SCORES--
TESTING MINUS TRAINING

Training Level	Stimulus Form		Total by Level
	Film	Tape	
Sophomores	0.73	2.55	1.64
Juniors	1.09	4.27	2.68
Seniors	0.00	-1.30	-0.62
Total by Form	0.61	1.94	

The p. value associated with level was 0.132, with form it was 0.560, and with the interaction effect it was 0.329. The t value required for a significant mean difference between cells was 5.64 (where the cell N = 10). The difference between the means for the junior-tape group and the senior-tape group approached that level with a 5.57 difference.

Cue Discrimination Change Scores

Two cue discrimination change scores were computed. The first was calculated for similar problem episodes. A second was computed for a total cue discrimination change score. Both calculation procedures were identical to those described in the previous section concerned with response change scores.

Similar problems.--No differences were statistically significant in comparing the mean differences for episodes with similar problems. The p. value for level was 0.896; for form, 0.548; and for the interaction it was 0.844, indicating little observable variation as a result of the independent variables.

Total change scores.--When the differences resulting from the subtraction of the total cue discrimination score for training from that of testing were analyzed, no significant differences were noted. The p. values associated with level, form, and interaction were 0.983, 0.195, and 0.518, respectively.

Attitude Scores

The scores attributed to the Sts' attitude assessment[11] were also analyzed via a two-way analysis of variance. Though no significant differences were found, the means for the individual cells, levels, and forms are shown in Table 29 because of the great importance of this measure. The p. value corresponding to level was 0.404, to form 0.470, and to interaction it was 0.478.

TABLE 29

MEANS FOR ATTITUDE SCORES

Training Level	Stimulus Form		Means for Levels
	Film	Tape	
Sophomores	71.00	75.27	73.27
Juniors	75.00	79.09	77.05
Seniors	78.18	75.40	76.57
Means for Forms	74.67	76.63	

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[11] See Appendix B for a discussion of the construction of the scale.

Analyses of Control Variables

The variables of set and test E were posited as control variables, i.e., both variables were held constant by randomly assigning an equal number of Sts from each cell of the experimental design (see Table 2) to one of the two episode sets for training and one of the two Es for testing. Several analyses were performed to identify the efficacy of the decision not to include these two factors as independent variables. These analyses are discussed in the following paragraphs.[12]

Set

Sixteen three-way analysis of variance problems were calculated using form, experimenter and set as main effects. Four measures were analyzed; the total test score minus the placebo episode for (1) responses and (2) cue discrimination, and the total test score for (3) responses and (4) cue discrimination. Each of the measures was analyzed four times to provide a partitioning effect for levels, i.e., using only (1) the sophomores, (2) the juniors, and (3) the seniors as well as (4) the total sample. In none of those analyses was the F-ratio significant for the main effect--set. In the 16 analyses, set was also an interactive component 48 times. In all those cases, set was also non-significant.

Four additional analyses were performed using the data for the same four measures with set, form, and level as main effects. Twice set was a significant effect--in analyses of means for training cue discrimination scores and total test response scores. Set was never significant in any of the 12 interaction results.

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[12] See the last two sections in Appendix A for the summary tables discussed in the remainder of this section.

In 80 analyses of set as either a main effect or as a component in an interaction effect, significant results were found only twice.

Experimenter

The first 17 analyses discussed above for set were used in analyzing the effects attributable to the *E*. In 11 of the 16 analyses the effect attributable to the *E* was significant. In two of those 11 measures, plus one other measure, the interaction effect of either set and/or form with *E* was significant. A total of 12 of the 16 analyses performed indicated the *E* variable contributed a significant effect to the mean test differences.

The same four measures were again analyzed using only *E* and level as main effects. In all cases the effect attributable to *E* variation surpassed the .05 significance level.

In 16 of the total of 20 analyses *E* variation contributed a significant effect.

Summary

The 11 hypotheses and the two control variables have been discussed statistically. In the next chapter, the hypotheses will be examined for the purpose of rejecting or accepting each as a null proposition. The control variables will be examined in light of the data presented to assess the efficacy of the decision not to include them as independent variables. Conclusions regarding the relative effectiveness and efficiency of the training formats will also be presented.

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

In the preceding chapter, the results of the analyses of the data were presented. The data were compiled to provide a rationale for the rejection or acceptance of 12 null hypotheses concerned with the effectiveness and efficiency of simulation as a training technique to be used with elementary education majors. Additional analyses were performed to determine the efficacy of the decision to include the factors of episode set and test E as control rather than experimental variables.

The .05 level of significance was chosen to reject a null hypothesis. Ten of the 12 hypotheses included sub-hypotheses. If the analysis for any of the incorporated sub-hypotheses reached a .05 significance level, the hypothesis was rejected. The rationale for this decision is based on the assumption that the sub-hypotheses are components of the hypothesis and that if one of those components cannot be considered in a null form, then the total hypothesis should be suspect. By rejecting the total hypothesis attention is drawn to the need for further study to isolate specific factors which may be influencing the significant difference attributed to that component of the hypothesis.

Conclusions Directed Toward Hypotheses

The hypotheses and the resultant sub-hypotheses are reiterated below. Following the enumeration of each hypothesis and any selected sub-hypotheses are the conclusions drawn from the analyses of the data collected for each hypothesis.

There will be no significant difference between sub-groups in:

1. The mean first response score for training--accepted
    a. The mean first response score for the first-half of training--accepted
    b. The mean first response score for the second-half of training--accepted
    c. The mean first response score for the total training--accepted
    d. The mean gain first response score--accepted

Four sub-hypotheses were examined as components of this hypothesis. The results of all four analyses proved to be non-significant. Though some variation in mean first response scores did occur, primarily as a result of stimulus form, the null form of the hypothesis was accepted. No significant differences in mean first response scores were noted as a result of training level, stimulus form, or their interaction.

There will be no significant difference between sub-groups in:

2. The mean number of incorrect responses given during training--rejected
    a. The mean number of incorrect responses for the first-half of training--rejected
    b. The mean number of incorrect responses for the second-half of training--accepted
    c. The mean number of incorrect responses for the total training--rejected
    d. The mean reduction score for incorrect responses--rejected

The analyses of the sub-hypotheses revealed significant differences for three of the four components chosen for study. The treatment effect of level proved to be a significant variable in the analyses for the mean number of incorrect responses given during the first-half of training and the total training. The interaction of level by form also revealed significant differences for the reduction of incorrect responses given in the second-half of training. Sophomores, particularly those trained with films, tended to give more incorrect reponses, but they and the seniors trained with audio-tapes reduced their errors in the second-half of training by the greatest amount. The null hypothesis that there will be no significant differences in the mean number of incorrect responses given during training was rejected.

There will be no significant difference between sub-groups in:

3. The mean number of initial cues discriminated during training--rejected
    a. The mean cues discriminated during the first-half of training--accepted
    b. The mean cues discriminated during the second-half of training--accepted
    c. The mean cues discriminated during the total training--rejected
    d. The mean gain for cues discriminated--accepted

One of the analyses for the four sub-hypotheses indicated a significant difference in the mean number of cues initially discriminated during training. The mean effects of form and set were both significant for the measure computed for the total training. Subjects trained with audio-tapes discriminated more total cues than did their counterparts trained with films. Set differences were noted, though the cause of this effect may have been due to a disproportionate number of cues to be discriminated in the two sets of problem episodes used in the study. Rejection of the null hypothesis, that there will be no significant differences in the mean initial cue discrimination score for training, did occur.

There will be no significant difference between sub-groups in:

4. The mean number of stimulus recyclings to achieve a type A response--rejected

The main effect of form revealed that a training format using films required a significantly greater number of stimulus recyclings. Though the absolute number of recyclings for either group was small, the null hypothesis that there would be no significant differences in stimulus recyclings was rejected.

There will be no significant difference between sub-groups in:

5. The mean number of experimenter (*E*) prompts for responses--*rejected*

    a. The mean *E* prompts for the first-half of training--*rejected*
    b. The mean *E* prompts for the second-half of training--*accepted*
    c. The mean *E* prompts for the total training--*accepted*
    d. The mean reduction score for *E* prompts--*accepted*

Sophomores required a significantly greater number of *E* prompts to achieve the response criterion in the first-half of training. Three additional analyses all revealed statistically non-significant effects attributable to level, form, or their interaction. The null form of the hypothesis that there would be no significant differences in *E* prompts required to elicit a criterion training response was rejected.

There will be no significant difference between sub-groups in:

6. The mean number of *E* prompts necessary to achieve criterion for cue discrimination--*rejected*

    a. The mean E prompts for the first-half of training--*rejected*
    b. The mean *E* prompts for the second-half of training--*accepted*
    c. The mean *E* prompts for the total training--*rejected*
    d. The mean reduction score for *E* prompts--*accepted*

Two of the four sub-hypotheses concerned with *E* prompts necessitated to achieve criterion for cue discrimination exhibited significant differences attributable to form. Subjects trained with audio-tapes required fewer prompts than those trained with films for the first-half as well as the total training. The hypothesis that no significant differences in the mean number of *E* prompts necessary to reach criterion for cue discrimination was rejected.

There will be no significant difference between sub-groups in:

7. The mean time for training and testing--*rejected*

    a. The mean time for the first-half of training--*accepted*
    b. The mean time for the second-half of training--*rejected*
    c. The mean time for the total training--*accepted*
    d. The mean reduction in training time--*accepted*
    e. The mean time for the total test--*rejected*
    f. The mean reduction in training time minus testing time--*accepted*

Four sub-hypotheses were analyzed to examine the effect of level, form, or their interaction on the amount of time spent in training. An additional pair of sub-hypotheses were used to study the effect of training form on test time requirements. One of the training analyses revealed significant differences in elapsed time for training as did one of the test analyses. During the second-half of training, sophomores and seniors trained with films were the two most inefficient groups. Subjects trained with films, regardless of level, tended to be significantly more inefficient to test. The proposition that no significant differences in elapsed time necessary for training or testing was rejected.

There will be no significant difference between sub-groups in:

8. The mean response score for testing--rejected
    a. The mean response score for oral stimulus episodes--accepted
    b. The mean response score for film stimulus episodes--accepted
    c. The mean response score minus the placebo episode--rejected
    d. The mean response score--rejected

Of the four components of the hypothesis directed toward the mean response score for testing, two indicated no significant differences. The last two sub-hypotheses examined the question of the response scores for the total test. The main effects of level, form, and set contributed significant influences. Juniors tended to achieve significantly higher response scores on the test than did the other two levels--sophomores or seniors. The differences attributed to set which were also noted were troublesome. In only one of the 19 other analyses, where the effect of set was studied, did one of the episode sets provide a significant difference. Of the analyses performed to isolate the effect of the control variables, eight of the 10 produced significant effects attributable to form. Subjects trained with audio-tapes achieved total test response scores significantly higher than those trained with films. The hypothesis that differences in mean response scores for testing would lack significance was rejected.

There will be no significant difference between sub-groups in:

9. The mean number of cues discriminated for testing--rejected
   - a. The mean cue discrimination score for oral stimulus episodes--accepted
   - b. The mean cue discrimination score for film stimulus episodes--accepted
   - c. The mean cue discrimination score minus the placebo episode--rejected
   - d. The mean cue discrimination score--rejected

When the main effects of level and form were used in the analyses of the four measures associated with the cue discrimination scores no significant differences were noted. A three-way analysis of variance using form, set, and E revealed, however, that form and, particularly, E contributed to significant differences for the two total test measures (9c and 9d above). The differences attributable to form made the decision to reject the null hypothesis for this measure mandatory.

There will be no significant difference between sub-groups in:

10. The mean first response change scores (training to testing)--accepted
    - a. The mean response change score for similar problem episodes--accepted
    - b. The mean response change score for episodes with similar standards--accepted
    - c. The mean response change score--accepted

Three analyses of the hypothesis that there would be no significant differences in first-response change scores all exhibited non-significant effects. Therefore, the null hypothesis was accepted.

There will be no significant difference between sub-groups in:

11. The mean change score for cue discrimination (training to testing)--accepted
    - a. The mean change score for cue discrimination for similar problem episodes--accepted
    - b. The mean change score for cue discrimination--accepted

Apparently, training format contributed to no significant differences in the two mean cue discrimination change scores. The null hypothesis that such a non-significance would be found was accepted.

There will be no significant difference between sub-groups in:

12. The mean attitude score--accepted

An analysis of the attitude assessment scores provided no differences which were significant. Slight differences were noted; the upperclassmen professed better attitudes toward their training than did the sophomores while those students trained with audio-tapes also exhibited a higher attitude score than did the subjects trained with films. The group which could be denoted as possessing the strongest positive attitude towards their simulation training was the juniors trained with audio-tapes. Due to the lack of statistical significance, though, the hypothesis that no differences in attitude would result was accepted in its null form.

Conclusions Directed Toward the Control Variables

Two variables were held constant within each cell of the experimental design (see Table 2). Differences accruing from the effect of episode set and test E were assumed to be of negligible influence. To test those two assumptions, 20 analyses were performed to isolate set effects and an equal number of analyses were performed to examine E effects. The conclusions derived from those statistical examinations are discussed below.

Set

Because only two of the 20 analyses concerned with the effect of set revealed any significant differences (or two out of a possible 80 effects) the assumption that the two groups of episodes could be considered comparable was retained. However, in those analyses where cue discrimination measures were examined, the unequal number of cues to be identified may have confounded some of those results. Though the assumption of set comparability is still held to be valid, the decision tends to be based as much on speculation as empirical evidence.

Experimenter

It became painfully apparent that the decision to not include the possible effect attributable to the test E as an independent variable was misguided. Sixteen of the 20 analyses revealed either interactive or main effects influenced by the E factor. How this result influences the credibility of the data collected for training (involving only one E) is speculative.

Effectiveness and Efficiency Conclusions

All of the measures collected for this study were categorized as either giving information concerning the relative effectiveness or efficiency of the various training formats. Both of these qualities are presented and discussed below in light of the conclusions drawn from each factor's constituent hypotheses.

Effectiveness

Seven hypotheses were concerned with effectiveness. The measures taken for those hypotheses follow:

1. First response score for training
2. Initial cues discriminated during training
3. Response score for testing
4. Cues discriminated during testing

5. First response change score
6. Cue discrimination change score
7. Attitude

The independent variable, training level, had a significant influence only on the total and total minus the placebo episode response score for testing (item 3 above). Juniors achieved a significantly higher response score for testing than did the sophomores or seniors. If the test response score is defined as a transfer measure (from training to testing) then the group that transferred its acquired response skills most effectively was the juniors.

Form, the second independent variable, had a significant effect on the measures for the test response scores (item 3 above) and cue discrimination scores for training and testing (items 2 and 4 above). Two generalizations were drawn as a result of these findings: (1) the group trained with audio-tapes achieved a higher test response score than did those subjects trained with films, and (2) audio-tapes were either more effective in aiding students to correctly discriminate the cues or the cues may have been more easily identified.[1]

For the other measures--items 1, 5, 6, and 7--neither of the independent variables caused a statistically significant effect. Stimulus form and level of elementary education training could not be demonstrated to influence those four dependent variables to a sufficient degree to warrant rejecting the null hypothesis corresponding to each.

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[1] The latter point is, certainly, worthy of consideration. For the test measure, when stimulus form cues to be discriminated were constant for all subjects, those trained with audio-tapes achieved a mean score of 28.50, while the film-trained subjects achieved a comparable score of 28.06 for test cues correctly assessed.

Efficiency

Five measures were examined as indices of efficiency in the implementation of the technique of simulation in a teacher education program. The listing of those independent variables follows:

1. Incorrect responses for training
2. Stimulus recyclings
3. E prompts for responses
4. E prompts for cue discrimination
5. Elapsed time

Significant effects for the variables, training level and stimulus form, were more pervasive when the efficiency measures were analyzed. Level provided main effect influences on the number of incorrect responses given during training (item 1 above) and the number of E prompts required for the St to achieve a criterion response (item 3 above). An interactive effect with form was also revealed in the elapsed time measure (item 5 above) for the second-half of training. In all three of the above analyses the sophomore subjects were involved. Sophomores made a greater number of incorrect responses during the total training. They required more E prompts for responses during the total training. Sophomore subjects trained with films and senior subjects trained with films required more training time than did the other four groups. If any one group can be identified as being most efficient to train, apparently, it would be the juniors, with the sophomores least efficient. However, the learning curves presented in Figures 4 and 5 in Chapter IV portray the sophomores as reaching a comparable level in the number of incorrect responses required for the second-half of training and the number of E prompts required for the same episodes. The lack of efficiency corresponding to the training of sophomores can be specifically attributed to only the first 10 episodes, i.e., the first-half of training.

Significant effects for form were noted for the measures identified as stimulus recyclings (item 2 above), E prompts for cue discrimination (item 4 above), and elapsed time (item 5 above). Interactions were also determined to be operating for the variables of incorrect responses for training and time for the second-half of training. In all but one case, subjects trained with films were less efficient. Audio-tape trained subjects required less stimulus recyclings, less E prompts to identify the relevant cues during the first-half as well as the total training, and less time to complete the test. As was noted above, sophomores and seniors trained with films required more time to complete the second-half of training. Sophomores trained with films and seniors trained with tapes reduced their incorrect response scores to a significantly greater degree than the other four experimental groups (see Table 2 in Chapter II). In other words, as the training progressed, both groups became more efficient than they had been at the beginning.

Summary

Twelve null hypotheses were considered in this study. They are enumerated below. There was assumed to be no significant difference between sub-groups in:

1. The mean first response score for training
2. The mean number of incorrect responses given during training
3. The mean number of initial cues discriminated during training
4. The mean number of stimulus recyclings to achieve a type A response
5. The mean number of experimenter (E) prompts for responses
6. The mean number of E prompts necessary to achieve criterion for cue discrimination

7. The mean time for training and testing
8. The mean response score for testing
9. The mean number of cues discriminated for testing
10. The mean first response change scores (training to testing)
11. The mean change score for cue discrimination (training to testing)
12. The mean attitude score

Eight of the 12 hypotheses selected for study were rejected in the null form--hypotheses 2, 3, 4, 5, 6, 7, 8, and 9. The remaining four were accepted as proposed--hypotheses 1, 10, 11, and 12. The assumption that episode set would not influence the findings of this study to a significant degree was held to be valid while that concerning the test E was found to be invalid. The independent variables of level and form influenced only three measures identified as factors of effectiveness. The effect of those variables (level and form) was most pervasive on those five measures categorized as efficiency indices, i.e., the five hypotheses all revealed differences attributable to the independent variables.

Implementing these findings in terms of further research and in terms of program development for teacher education institutions is discussed in Chapter VI which follows.

CHAPTER VI

IMPLICATIONS

Introduction

Simulation has become an important technique in the training of preservice teachers. Yet, there are many questions surrounding the relative effectiveness and efficiency of various types of simulations. The data collected for this study have been used to isolate two variables for examination--the influence of the level of elementary education training coupled with the use of either a visual or aural stimulus presentation. The conclusions drawn from the analysis of these independent variables (presented in Chapter V) have several implications for further research as well as for the use of simulations in teacher education programs. A discussion of these inferences is presented in the remainder of this chapter.

Research

Certainly, any further research into the use of simulations, particularly studies using the Classroom Management Materials (Kersh, 1963), must control for E bias. The findings of this study as well as others (Twelker et al. 1968, pp. 51-52; Kersh, 1965a, p. 52) have been obfuscated by the effects attributable to E differences. Though the Es in this study trained together prior to testing and revealed an adequate reliability level on both measures--response and cue discrimination categorizations--the differences between the Es became statistically significant during testing. To ensure greater reliability, future studies will need to include periodic and simultaneous retraining exercises to control for this fluctuation. What the optimum interval might be is unknown though training sessions spaced no further than a week apart might be appropriate.

A question of response assessment techniques still remains unsolved. If the E bias hinders the ability to draw generalizations from experimental data then a more reliable technique of assessing the St's ability to cope with simulated management problems needs to be devised and implemented. Apparently, the subjectivity which is operating in Kersh's categorization system (see Appendix F) is detrimental to the development of inductive conclusions.

Very little programatic effort has been directed toward the development of training packages for secondary education pre-service teachers. Intuitively, it would seem that the interactive patterns of junior high and high school teacher trainees would not differ markedly in the problems encountered. Nevertheless, programs developed for the use of secondary trainees would require further analysis to determine empirically what simulations as well as level of subject experience can be deemed to be most expedient to ensure effective learning of classroom management principles.

This study examined only two forms of simulation--films and audiotapes. The results indicate differential effects attributable to stimulus form. No generalizations can be made to other fidelity levels such as case studies, slide-tape presentations, or role-playing without further experimentation.

Replicatory study is necessary to ensure that sampling error was not a fault of this study. A larger sample drawn from more than one institution is a requisite for the establishment of more definitive generalizations.

A type of episode identified by Kersh (1963) as a communication problem seemed to be the most difficult to which to respond appropriately for all subjects in this study. Of the 10 most difficult training episodes, nine were classified as communication problems. Only one management problem, the other categorization of episode type, was ranked in the top 10 as being most difficult for Sts to generate a type A response. (See Definition of Terms in Chapter II for the specification of a type A response.) An examination of the optimal number of times a subject needs to be presented particular problems to ensure learning is, then, another question for further study.

No follow-up of the subjects in this study was performed. Such efforts are needed to determine whether retention is an important variable to consider in implementing a simulation type at a specified level of elementary education training.

Programed instruction and, as an outgrowth of programing, computer assisted instruction might become important vehicles for the training of specific classroom management behaviors. Inferences drawn from the data presented in this study provide no barriers to effectiveness. A question would arise, though, as to the relative effectiveness and efficiency of either stimulus form (films or audio-tapes) used with any training level without an E present in the training situation. This problem can only be resolved empirically.

Teacher Training

The ability to use a form of programed instruction to train pre-service teachers would certainly make the use of simulations a more feasible decision. The data presented here (considering the sampling limitation) would indicate that audio-tape training is more efficient and of comparable effectiveness when compared to films designed to accomplish the same objective. Programing difficulties with films would be more extensive than with tapes. In terms of monetary and man-power limitations, the use of audio-tapes for training, particularly for programed instruction, should be considered as a viable alternative to films.

The major handicap with the use of programed instruction may be the problem of limited reliability in categorizing St responses. If a set of Es with a great deal of professional experience encounter difficulties in reliably assessing the response type which is elicited, the St may experience even greater difficulty. On the other hand, the St would be better prepared to assess the intent of his response than an observer. The use of programed instruction may require pre-training for the Sts and the program developers. The St may be required to learn to assess and state the intent of his response while the program developer learns to categorize the assumed effect of that response and then write an appropriate program for the St to follow.

In light of the limited differential effects categorized as indices of effectiveness, the development of pilot packages might well be done with audio-tapes. Training with one stimulus form seemed to provide little definitive effect, positively or negatively, in the subject's ability to respond to test simulations presented by either film or audio-tape. No limitations in transfer as a result of stimulus form were identified.

A marked differential occurred in the training of the three subject levels. Sophomores were significantly more inefficient to train early in the program than were the upperclassmen. Institutions preparing teachers may find it is to their younger students' advantage to provide them with classroom management training. If the results of such training are similar to those in this study, the early inefficiency is traded for increased effectiveness, i.e., the underclassmen would become comparable to the upperclassmen in and responding to simulated classroom problems with a small increase in training time expenditure. Sophomores tended, during the first-half of training, to give less adequate responses, to need more attempts to "discover" an adequate response, to require more E prompts to achieve an adequate response, and to require more training time. During the second-half of training, the sophomores achieved scores comparable to those of the upperclassmen. In the test situation the sophomores even surpassed the seniors on some measures, i.e., the three test response scores of total minus the placebo episode score, total response score, and the change score.

Certainly, these data may mean that teacher training institutions will need to re-evaluate their choice of level in the implementation of instructional simulations. If institutional efforts did replicate those in this study, the expenditure of one or two hours of additional training would prepare sophomores to be as efficient and effective as upperclassmen in dealing with simulated classroom problems. Such an expenditure may be even more practical for large institutions where the cost of the acquisition or production of the simulation materials can be prorated over a greater number of students.

This study replicated the finding of many others--students enjoy simulations. The mean attitude score for this study was 75.66 where 45.00 would be construed as a neutral attitude. The lowest single score given by a St was 60. Due to the accruement of a positive attitude the mere implementation of a simulation program may be enough to ensure its initial success as a teaching device.

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APPENDIX A

ANALYSIS OF VARIANCE SUMMARY TABLES FOR SELECTED HYPOTHESES AND CONTROL VARIABLES

ADDITIONAL ANALYSIS OF VARIANCE SUMMARY TABLES FOR HYPOTHESES

TABLE 30

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION GAIN SCORES

Source	df	MS	F	p. less than
Level	2	103.619	1.209	0.306
Form	1	77.299	0.902	0.346
Level X Form	2	110.654	1.291	0.283
Within	59	85.722		
Total	64			

$*p. < .05$

TABLE 31

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE PROMPTS--SECOND-HALF

Source	df	MS	F	p. less than
Level	2	7.630	0.554	0.577
Form	1	2.602	0.189	0.665
Level X Form	2	12.090	0.878	0.421
Within	59	13.766		
Total	64			

$*p. < .05$

TABLE 32

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE PROMPTS--TOTAL TRAINING

Source	df	MS	F	p. less than
Level	2	108.023	2.875	0.064
Form	1	9.045	0.241	0.625
Level X Form	2	17.950	0.478	0.623
Within	59	37.568		
Total	64			

*p. < .05

TABLE 33

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE PROMPT REDUCTION SCORES

Source	df	MS	F	p. less than
Level	2	118.039	2.225	0.117
Form	1	14.886	0.281	0.598
Level X Form	2	15.375	0.290	0.749
Within	59	53.039		
Total	64			

*p. < .05

TABLE 34

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION PROMPTS--SECOND-HALF

Source	df	MS	F	p. less than
Level	2	1.052	0.225	0.799
Form	1	12.401	2.648	0.109
Level X Form	2	3.476	0.742	0.480
Within	59	4.684		
Total	64			

*p. < .05

TABLE 35

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION PROMPT REDUCTION SCORES

Source	df	MS	F	p. less than
Level	2	3.989	0.330	0.721
Form	1	13.463	1.113	0.296
Level X Form	2	12.776	1.056	0.354
Within	59	12.102		
Total	64			

*p. < .05

TABLE 36

ANALYSIS OF VARIANCE SUMMARY FOR ELAPSED TRAINING TIME--FIRST-HALF

Source	df	MS	F	p. less than
Level	2	86.327	1.102	0.339
Form	1	25.641	0.327	0.569
Level X Form	2	137.737	1.759	0.181
Within	59	78.305		
Total	64			

*p. < .05

TABLE 37

ANALYSIS OF VARIANCE SUMMARY FOR ELAPSED TRAINING TIME--TOTAL

Source	df	MS	F	p. less than
Level	2	70.482	0.816	0.447
Form	1	36.323	0.421	0.519
Level X Form	2	210.212	2.435	0.096
Within	59	86.327		
Total	64			

*p. < .05

TABLE 38

ANALYSIS OF VARIANCE SUMMARY FOR ELAPSED TRAINING TIME--REDUCTION SCORES

Source	df	MS	F	p. less than
Level	2	9.657	0.210	0.811
Form	1	22.121	0.480	0.491
Level X Form	2	15.499	0.336	0.716
Within	59	46.064		
Total	64			

*p. < .05

TABLE 39

ANALYSIS OF VARIANCE SUMMARY FOR ELAPSED TESTING TIME--REDUCTION SCORES

Source	df	MS	F	p. less than
Level	2	191.128	2.389	0.101
Form	1	189.202	2.365	0.129
Level X Form	2	207.274	2.591	0.083
Within	59	80.009		
Total	64			

*p. < .05

TABLE 40

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--AUDIO-TAPE EPISODES

Source	df	MS	F	p. less than
Level	2	15.867	2.310	0.108
Form	1	5.094	0.742	0.393
Level X Form	2	10.045	1.462	0.240
Within	59	6.868		
Total	64			

*p. < .05

TABLE 41

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--FILM EPISODES

Source	df	MS	F	p. less than
Level	2	14.256	1.337	0.270
Form	1	4.155	0.390	0.535
Level X Form	2	25.225	2.366	0.103
Within	59	10.663		
Total	64			

*p. < .05

TABLE 42

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL MINUS THE PLACEBO EPISODE

Source	df	MS	F	p. less than
Level	2	74.494	2.859	0.065
Form	1	15.531	0.596	0.443
Level X Form	2	7.071	0.271	0.763
Within	59	26.052		
Total	64			

*p. < .05

TABLE 43

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--AUDIO-TAPE EPISODES

Source	df	MS	F	p. less than
Level	2	29.386	1.102	0.339
Form	1	8.146	0.316	0.576
Level X Form	2	42.490	1.594	0.212
Within	59	26.656		
Total	64			

*p. < .05

TABLE 44

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--FILM EPISODES

Source	df	MS	F	p. less than
Level	2	1.808	0.393	0.677
Form	1	2.816	0.611	0.437
Level X Form	2	4.093	0.889	0.417
Within	59	4.606		
Total	64			

*p. < .05

TABLE 45

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL MINUS THE PLACEBO EPISODE

Source	df	MS	F	p. less than
Level	2	7.909	0.723	0.490
Form	1	1.767	0.161	0.689
Level X Form	2	6.191	0.566	0.571
Within	59	10.946		
Total	64			

*p. < .05

TABLE 46

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL

Source	df	MS	F	p. less than
Level	2	7.213	0.571	0.568
Form	1	2.396	0.190	0.665
Set	1	14.770	1.170	0.284
Level X Form	2	4.621	0.366	0.695
Level X Set	2	1.554	0.123	0.884
Form X Set	1	4.609	0.365	0.548
Level X Form X Set	2	8.144	0.645	0.529
Within	53	12.621		
Total	64			

*p. < .05

TABLE 47

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE CHANGE SCORES--SIMILAR PROBLEM EPISODES

Source	df	MS	F	p. less than
Level	2	3.283	0.333	0.718
Form	1	2.621	0.266	0.608
Level X Form	2	4.093	0.416	0.662
Within	59	9.845		
Total	64			

*p. < .05

TABLE 48

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE CHANGE SCORES--SIMILAR STANDARD EPISODES

Source	df	MS	F	p. less than
Level	2	3.502	0.695	0.503
Form	1	4.702	0.933	0.338
Level X Form	2	6.036	1.198	0.309
Within	59	5.038		
Total	64			

*p. < .05

TABLE 49

ANALYSIS OF VARIANCE SUMMARY FOR RESPONSE CHANGE SCORES--TOTAL

Source	df	MS	F	p. less than
Level	2	83.505	2.094	0.132
Form	1	13.725	0.344	0.560
Level X Form	2	45.155	1.133	0.329
Within	59	39.871		
Total	64			

*p. < .05

TABLE 50

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION CHANGE SCORES--SIMILAR PROBLEM EPISODES

Source	df	MS	F	p. less than
Level	2	0.376	0.110	0.896
Form	1	1.247	0.365	0.548
Level X Form	2	0.581	0.170	0.844
Within	59	3.414		
Total	64			

*p. < .05

TABLE 51

ANALYSIS OF VARIANCE SUMMARY FOR CUE DISCRIMINATION CHANGE SCORES--TOTAL

Source	df	MS	F	p. less than
Level	2	0.393	0.018	0.983
Form	1	38.416	1.721	0.195
Level X Form	2	14.859	0.666	0.518
Within	59	22.320		
Total	64			

*p. < .05

TABLE 52

ANALYSIS OF VARIANCE SUMMARY FOR ATTITUDE SCORES

Source	df	MS	F	p. less than
Level	2	106.219	0.921	0.404
Form	1	60.829	0.528	0.470
Level X Form	2	86.079	0.747	0.478
Within	59	115.273		
Total	64			

*p. < .05

ANALYSIS OF VARIANCE SUMMARY TABLES FOR SET AND EXPERIMENTER CONTROL VARIABLES

TABLE 53

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL MINUS THE PLACEBO EPISODE (SOPHOMORES ONLY)

Source	df	MS	F	p. less than
Form	1	236.402	20.253*	0.001
Set	1	0.182	0.016	0.902
Experimenter	1	26.217	2.246	0.156
Form X Set	1	0.464	0.040	0.845
Form X Experimenter	1	0.683	0.059	0.812
Set X Experimenter	1	45.220	3.874	0.069
Form X Set X Experimenter	1	0.507	0.043	0.838
Within	14	11.673		
Total	21			

*p. < .05

TABLE 54

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL MINUS THE PLACEBO EPISODE (JUNIORS ONLY)

Source	df	MS	F	p. less than
Form	1	29.274	1.911	0.189
Set	1	28.409	1.854	0.195
Experimenter	1	68.096	4.444	0.054
Form X Set	1	11.267	0.735	0.406
Form X Experimenter	1	8.898	0.581	0.459
Set X Experimenter	1	9.336	0.609	0.448
Form X Set X Experimenter	1	10.083	0.658	0.431
Within	14			
Total	21			

*p. < .05

TABLE 55

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL MINUS THE PLACEBO EPISODE (SENIORS ONLY)

Source	df	MS	F	p. less than
Form	1	248.950	10.839*	0.006
Set	1	1.082	0.047	0.832
Experimenter	1	90.730	3.950	0.068
Form X Set	1	3.463	0.151	0.704
Form X Experimenter	1	40.749	1.774	0.206
Set X Experimenter	1	17.536	0.764	0.398
Form X Set X Experimenter	1	12.715	0.554	0.470
Within	13	22.968		
Total	20			

*p. < .05

TABLE 56

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL MINUS THE PLACEBO EPISODE (ALL SUBJECTS)

Source	df	MS	F	p. less than
Form	1	438.764	25.308*	0.001
Set	1	16.899	0.975	0.328
Experimenter	1	206.154	11.891*	0.001
Form X Set	1	0.121	0.007	0.934
Form X Experimenter	1	13.813	0.797	0.376
Set X Experimenter	1	50.907	2.936	0.092
Form X Set X Experimenter	1	0.900	0.052	0.821
Within	57	17.337		
Total	64			

*p. < .05

TABLE 57

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL (SOPHOMORES ONLY)

Source	df	MS	F	p. less than
Form	1	250.983	20.419*	0.001
Set	1	0.000	0.000	1.000
Experimenter	1	46.771	3.805	0.071
Form X Set	1	5.898	0.480	0.500
Form X Experimenter	1	57.394	4.669*	0.049
Set X Experimenter	1	0.554	0.045	0.835
Form X Set X Experimenter	1	1.408	0.115	0.740
Within	14			
Total	21			

*p. < .05

TABLE 58

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL (JUNIORS ONLY)

Source	df	MS	F	p. less than
Form	1	28.023	1.712	0.212
Set	1	16.408	1.002	0.334
Experimenter	1	71.345	4.359	0.056
Form X Set	1	9.869	0.603	0.450
Form X Experimenter	1	7.788	0.476	0.502
Set X Experimenter	1	16.364	1.000	0.334
Form X Set X Experimenter	1	8.897	0.544	0.473
Within	14	16.369		
Total	21			

*p. < .05

TABLE 59

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL (SENIORS ONLY)

Source	df	MS	F	p. less than
Form	1	244.408	11.375*	0.005
Set	1	4.243	0.197	0.664
Experimenter	1	115.744	5.387*	0.037
Form X Set	1	4.286	0.199	0.662
Form X Experimenter	1	35.725	1.663	0.220
Set X Experimenter	1	11.609	0.540	0.475
Form X Set X Experimenter	1	11.791	0.549	0.472
Within	13	21.487		
Total	20			

*p. < .05

TABLE 60

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL (ALL SUBJECTS)

Source	df	MS	F	p. less than
Form	1	440.480	25.359*	0.001
Set	1	13.510	0.778	0.382
Experimenter	1	262.352	15.104*	0.001
Form X Set	1	3.069	0.177	0.676
Form X Experimenter	1	12.752	0.734	0.395
Set X Experimenter	1	59.547	3.428	0.069
Form X Set X Experimenter	1	1.342	0.077	0.782
Within	57	17.370		
Total	64			

*p. < .05

TABLE 61

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL MINUS THE PLACEBO EPISODE (SOPHOMORES ONLY)

Source	df	MS	F	p. less than
Form	1	6.801	2.767	0.118
Set	1	3.682	1.498	0.241
Experimenter	1	138.771	56.449*	0.001
Form X Set	1	1.116	0.454	0.511
Form X Experimenter	1	0.243	0.099	0.758
Set X Experimenter	1	0.370	0.151	0.704
Form X Set X Experimenter	1	1.191	0.485	0.498
Within	14	2.458		
Total	21			

*p. < .05

TABLE 62

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL MINUS THE PLACEBO EPISODE (JUNIORS ONLY)

Source	df	MS	F	p. less than
Form	1	0.341	0.047	0.831
Set	1	8.909	1.241	0.284
Experimenter	1	83.674	11.656*	0.004
Form X Set	1	16.713	2.328	0.149
Form X Experimenter	1	0.231	0.032	0.860
Set X Experimenter	1	5.602	0.780	0.392
Form X Set X Experimenter	1	1.120	0.156	0.699
Within	14	7.179		
Total	21			

*p. < .05

TABLE 63

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL MINUS THE PLACEBO EPISODE
(SENIORS ONLY)

Source	df	MS	F	p. less than
Form	1	0.582	0.085	0.775
Set	1	1.559	0.228	0.641
Experimenter	1	111.956	16.399*	0.001
Form X Set	1	0.325	0.048	0.831
Form X Experimenter	1	44.227	6.478*	0.024
Set X Experimenter	1	3.444	0.505	0.490
Form X Set X Experimenter	1	5.444	0.797	0.388
Within	13	6.827		
Total	20			

*p. < .05

TABLE 64

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL MINUS THE PLACEBO EPISODE
(ALL SUBJECTS)

Source	df	MS	F	p. less than
Form	1	6.203	1.143	0.290
Set	1	2.005	0.369	0.546
Experimenter	1	332.811	61.305*	0.001
Form X Set	1	5.593	1.030	0.314
Form X Experimenter	1	10.053	1.852	0.179
Set X Experimenter	1	1.021	0.188	0.666
Form X Set X Experimenter	1	8.659	1.595	0.212
Within	57	5.429		
Total	64			

*p. < .05

TABLE 65

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL (SOPHOMORES ONLY)

Source	df	MS	F	p. less than
Form	1	12.272	5.066*	0.041
Set	1	2.227	0.919	0.354
Experimenter	1	160.662	66.317*	0.001
Form X Set	1	1.222	0.504	0.489
Form X Experimenter	1	0.001	0.001	0.982
Set X Experimenter	1	0.835	0.345	0.567
Form X Set X Experimenter	1	0.182	0.075	0.788
Within	14	2.423		
Total	21			

*p. $<$ .05

TABLE 66

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL (JUNIORS ONLY)

Source	df	MS	F	p. less than
Form	1	2.673	0.308	0.588
Set	1	10.227	1.177	0.296
Experimenter	1	82.256	9.465*	0.008
Form X Set	1	28.017	3.224	0.094
Form X Experimenter	1	0.593	0.068	0.798
Set X Experimenter	1	5.007	0.576	0.460
Form X Set X Experimenter	1	0.333	0.038	0.848
Within	14	8.691		
Total	21			

*p. $<$ .05

TABLE 67

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES-- TOTAL (SENIORS ONLY)

Source	df	MS	F	p. less than
Form	1	1.158	0.169	0.688
Set	1	0.956	0.139	0.715
Experimenter	1	105.749	15.403*	0.002
Form X Set	1	1.000	0.146	0.709
Form X Experimenter	1	48.074	7.002*	0.020
Set X Experimenter	1	4.305	0.627	0.443
Form X Set X Experimenter	1	6.746	0.983	0.340
Within	13	6.865		
Total	20			

*p. $<$ .05

TABLE 68

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION-- TOTAL (ALL SUBJECTS)

Source	df	MS	F	p. less than
Form	1	14.113	2.293	0.135
Set	1	2.657	0.432	0.514
Experimenter	1	343.884	55.865*	0.001
Form X Set	1	7.559	1.228	0.272
Form X Experimenter	1	7.476	1.214	0.275
Set X Experimenter	1	1.068	0.173	0.679
Form X Set X Experimenter	1	6.127	0.995	0.323
Within	57	6.156		
Total	64			

*p. $<$ .05

ANALYSIS OF VARIANCE SUMMARY TABLES FOR EXPERIMENTER CONTROL VARIABLE

TABLE 69

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL MINUS THE PLACEBO EPISODE (LEVEL BY _E_)

Source	df	MS	F	p. less than
Level	2	74.495	3.344*	0.042
Experimenter	1	234.315	10.517*	0.002
Level X Experimenter	2	8.972	0.403	0.670
Within	59	22.280		
Total	64			

*p. < .05

TABLE 70

ANALYSIS OF VARIANCE SUMMARY FOR TEST RESPONSE SCORES--TOTAL (LEVEL BY _E_)

Source	df	MS	F	p. less than
Level	2	150.396	3.196*	0.048
Experimenter	1	459.589	9.766*	0.003
Level X Experimenter	2	56.079	1.192	0.311
Within	59	47.058		
Total	64			

*p. < .05

TABLE 71

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL MINUS THE PLACEBO EPISODE (LEVEL BY E)

Source	df	MS	F	p. less than
Level	2	7.909	1.370	0.262
Experimenter	1	317.003	54.916*	0.001
Level X Experimenter	2	1.193	0.207	0.814
Within	59	5.772		
Total	64			

*p. < .05

TABLE 72

ANALYSIS OF VARIANCE SUMMARY FOR TEST CUE DISCRIMINATION SCORES--TOTAL (LEVEL BY E)

Source	df	MS	F	p. less than
Level	2	7.212	1.094	0.342
Experimenter	1	325.593	49.374*	0.001
Level X Experimenter	2	2.333	0.354	0.703
Within	59	6.594		
Total	64			

*p. < .05

APPENDIX B

ATTITUDE SCALE MATERIALS

ANALYSIS OF ATTITUDE ITEMS

A two-dimensional matrix was devised for item construction. The vertical axis became the "object" dimension which included three components. These objects of the simulation experience included the development of an attitude toward:

1. The management problems
2. The communication problems
3. Simulation as a teaching device

The horizontal matrix included four "needs" which Abraham Maslow (Blocher, 1966, pp. 73-75) has identified as influencing attitude development:

1. Security
2. Belonging
3. Status
4. Self-actualization

The construction matrix is shown below. The cells are numbered to enhance further discussion.

TABLE 73

ITEM CONSTRUCTION MATRIX

Objects	Needs			
	Security	Belongings	Status	Self-Actualization
Management Problems	1	2	3	4
Communication Problems	5	6	7	8
Simulation as Device	9	10	11	12

Only those items with phi coefficient values (Ø) greater than .50 were selected for inclusion in the final attitude assessment. Twenty items were then matched for S values and cell placement to provide two forms suitable for analysis by split-half reliability. That corresponding information is shown below.

TABLE 74

ITEM MATCHING

Form	Item No.	Cell	S	Ø
I	34	1	6.0	.56
II	26	1	2.9	.61
I	13	2	2.4	.54
II	3	2	5.9	.56
I	5	3	5.4	.52
II	30	3	1.6	.58
I*		4		
II*		4		
I	28	5	2.8	.64
II	10	5	5.8	.66
I	19	6	6.0	.65
II	31	6	2.2	.52
I	40	7	2.1	.67
II	35	7	6.4	.61
I	24	8	6.7	.67
II	32	11**	1.4	.64
I	2	9	6.0	.57
II	33	9	2.4	.58
I	14	2**	1.6	.58
II	4	10	5.9	.64
I*		11		
II*		11		
I	38	12	1.0	.54
II	39	12	6.9	.50

*Less than two items had Ø values equal to or greater than .50.
**To equalize Ø and S values, items from other cells had to be used.

3

A ranking by S values for each form is shown below:

TABLE 75

ITEMS RANKED BY S FOR EACH FORM

Item	Form I	Form II	Item
24	6.7	6.9	39
2	6.0	6.4	35
19	6.0	5.9	3
34	6.0	5.9	4
5	5.4	5.8	10
28	2.8	2.9	26
13	2.4	2.4	33
40	2.1	2.2	31
14	1.6	1.6	30
38	1.0	1.4	32

A Pearson product-moment analysis provided a correlation of .71 for a split-half reliability estimate when adjusted by a Spearman-Brown prophecy formula (Wert et al. 1954, p. 332).

Number______________

Student Attitude Toward Simulation as an Undergraduate Elementary Education Training Technique

Directions:

Circle SA if you strongly agree with a statement, A if you agree, MA if you mildly agree, MD if you mildly disagree, D if you disagree, and SD if you strongly disagree.

Please do not spend more than 10 to 15 seconds on each item. The entire inventory should take no more than 10 minutes.

Please do not omit any items.

	Strongly Agree	Agree	Mildly Agree	Mildly Disagree	Disagree	Strongly Disagree
1. Simulation training is one of the most valuable experiences in the teacher education program.	SA	A	MA	MD	D	SD
*2. Simulation makes students feel more confident of their teaching capability.	SA	A	MA	MD	D	SD
**3. Students who have gone through simulation will make better discipline decisions as student teachers.	SA	A	MA	MD	D	SD
**4. Simulation helps one feel more like a member of the teaching profession.	SA	A	MA	MD	D	SD
*5. If a student successfully deals with the episodes on note-passing she will probably do well with those kinds of situations as a student teacher.	SA	A	MA	MD	D	SD

---

*Form I item
**Form II item

6. New teachers would have more self-confidence in discipline situations if they had gone through simulation training. SA A MA MD D SD

7. Simulation episodes that dealt with the ineffectiveness of a group were very beneficial. SA A MA MD D SD

8. The note-passing episodes do nothing to make a student a more successful student teacher. SA A MA MD D SD

9. Situations that dealt with home-school interest conflicts won't help many people to be better student teachers. SA A MA MD D SD

**10. Being able to solve problems dealing with student inattention gives one a feeling of self-confidence. SA A MA MD D SD

11. Situations that deal with episodes where the student teacher needed to move toward the problem make student's a better judge of teacher behavior. SA A MA MD D SD

12. Students who have gone through simulation will be able to establish a greater rapport with their children. SA A MA MD D SD

*13. Successfully handling a simulation problem dealing with disorderly behavior doesn't make a person feel needed. SA A MA MD D SD

*14. Students trained in simulation won't make discipline decisions better geared to the individual child than anyone else. SA A MA MD D SD

15. Episodes where the class was passing notes were beneficial in helping one derive possible solutions. SA A MA MD D SD

SA	strongly agree
A	agree
MA	mildly agree
MD	mildly disagree
D	disagree
SD	strongly disagree

16. The simulation episodes that dealt with home-school interest conflicts are irrelevant to a student's needs. SA A MA MD D SD

17. Successfully handling simulation problems concerning a disruptive student makes a person feel needed. SA A MA MD D SD

18. New teachers would feel more secure communicating to children if they had gone through simulation training as students. SA A MA MD D SD

*19. Successfully dealing with tired children in a simulated problem makes a student feel needed. SA A MA MD D SD

20. The problems that dealt with student fatigue won't bring to a student's attention a new problem. SA A MA MD D SD

21. Episodes dealing with disruptive students gave little information useful for future situations. SA A MA MD D SD

22. Being asked to respond to a question like, "Can I stay in from recess?" certainly forces one to think. SA A MA MD D SD

23. Being unsuccessful in interesting the simulated children in an assignment makes one apprehensive about student teaching. SA A MA MD D SD

*24. A person's chances of being a good student teacher are greatly improved after participating in simulation. SA A MA MD D SD

25. The probability of a person being successful as a student teacher can probably be measured by her success in handling simulated communication problems. SA A MA MD D SD

SA	strongly agree
A	agree
MA	mildly agree
MD	mildly disagree
D	disagree
SD	strongly disagree

**26. The episodes that dealt with discipline problems make one feel uncomfortable. SA A MA MD D SD

27. The problems that showed the class running to the door were unrealistic. SA A MA MD D SD

*28. Successfully disciplining simulated children will not give a person added confidence about student teaching. SA A MA MD D SD

29. The episodes that dealt with communication problems make students feel insecure. SA A MA MD D SD

**30. Students who can successfully handle simulated discipline problems won't be any better teachers than those who can't. SA A MA MD D SD

**31. Students who have gone through simulation will be too dependent upon their supervising teachers regarding communication problems. SA A MA MD D SD

**32. Simulation training does little to aid one in becoming a good student teacher. SA A MA MD D SD

**33. Simulation makes students uncomfortable because they are always "on the spot." SA A MA MD D SD

*34. Learning how to handle simulated problems dealing with disorderly children helps students feel more self-confident. SA A MA MD D SD

**35. The experience gained from solving simulated problems dealing with group inattention will prove invaluable. SA A MA MD D SD

SA	strongly agree
A	agree
MA	mildly agree
MD	mildly disagree
D	disagree
SD	strongly disagree

36. The problems that dealt with giving directions to the class will give a person a great deal of help as a student teacher. SA A MA MD D SD

37. Successfully handling a simulation problem dealing with a tired child doesn't make a person feel needed. SA A MA MD D SD

*38. Simulation training is a farce. SA A MA MD D SD

**39. Simulation training makes one feel like an unwanted member of the teaching profession. SA A MA MD D SD

*40. Situations which require the student to try to interest a child in an assignment will not be beneficial. SA A MA MD D SD

SA	strongly agree
A	agree
MA	mildly agree
MD	mildly disagree
D	disagree
SD	strongly disagree

APPENDIX C

AUDIO-TAPE MATERIALS

Judge:

Your task is to evaluate the content of the taped oral presentation (called Episode Descriptions) that will be given to students going through simulation training. The criterion to be used is deciding whether the oral presentation describes as well as possible the filmed presentation. The oral presentations or Episode Descriptions are also printed for you.* Evaluate the taped Episode Descriptions using the Judging Forms.

The students who hear the oral presentation must have a similar opportunity to discriminate cues that will lead them to identify the same problem as those students who see the film.

Directions to Judges:

1. Set up the motion picture projector.
2. Put film Series II on the projector.
3. There are twenty problems or episodes on each film series. Between episodes there is a section of black leader which will signal you that the end of an episode has been reached.
4. Before viewing or listening to episode 1 on Series II read the Situation Description. (This segment is not to be judged--it is merely for your information.)
5. Listen to the taped Episode Description for episode 1, Series II.
6. View the film. Stop it when you see the black leader.
7. Replay the Episode Description for that episode.
8. Evaluate the Episode Description using the criteria on the Judging Form.
9. When you have completed the judging process for episode 1 move on to episode 2. Start with step 4 above.
10. When you have completed all twenty episodes for Series II, rewind the film and put on Series III. Start with step 3 above.

---

*The typed Episode Description also identifies the end of the filmed sequence that a subject would see; i.e., see the last line of the typed Episode Description for Series II, episode #2.

11. When you have completed episode 20 for Series III leave the materials where they are. I'll clean it up for you.

AUDIO-TAPE TRANSCRIPTIONS

Set I

1. As the episode begins you'll see the two girls on the far right side of the room. The remainder of the children seem to be busy. Wendy will begin speaking to you, (voice dub) "You know, my daddy let me stay up late last night to watch a movie on TV and I don't know whether I can make it through the day or not. It was called The Diary of Anne Frank and my daddy told me to watch it. I'm sure glad I did."

2. You are still standing on the far right side of the room. You'll see Shirley and Wendy as you did in the previous episode. The children in the back of the room will be moving around quietly. Shirley will begin speaking to you, (voice dub) "I didn't get to sleep till late last night either because I had so much homework to do. Daddy says you shouldn't give us so much homework." (End of episode--rest is a feedback.)

3. As the scene opens you will see only the far right side of the room from the aisle over. The children in this section are working quietly at their desks. The group at the back of the room working on the bulletin board is made up of four girls. One little girl looks out the door, points out the door, then turns and talks to her neighbors. The girls become noticeably excited. Linda turns, moves toward you about 10 feet and says, (voice dub) "Hey, there's a fight out there!" The class members who are working at their seats look up at you briefly. Then Randy shoves his chair away from his desk and begins quickly to move toward the door. Suzanne stands up as if to move toward the door. (Episode ends at "blip"--rest is a feedback.)

4. You are standing at the front of the room. You'll see the children all gathered around the door at the back of the room. Most of them are shouting, pointing, shoving and laughing. The children begin jumping up and down in order to see more clearly. The exuberance of the group continues as the children begin to jump and laugh to an even greater degree. The children will continue this activity.

5. In response to your question, Linda raises her hand and says, (voice dub) "Well, the water evaporates and then it comes down from the clouds." As Linda gives this response, the children turn slightly to look at her. Donna next raises her hand and says, (voice dub) "Only black clouds give rain." The children turn to see Donna. Ron is the next child to make a comment. He says, (voice dub) "My grandfather said that when he was a boy it rained frogs for two days." The class is immediately interested in this comment. The remaining members of the class turn to Ron and various comments can be heard, (voice dub) "That's funny!" The children seem disbelieving of Ron's comment and turn toward you expectantly. (End of episode--Ron's next comment is a feedback.)

6. The children will begin to follow your instructions and take out their science books. Some of the children will seem not to be particularly excited about this assignment. Bryan, instead of taking out his science book, seems to be looking idly out the window. Keith, in the back of the room, has not taken out his science book either.

7. The children are all studying very quietly. Dan, in the front, is missing from the room right now. The reason for his absence need not concern you. During the time the children are studying, Keith gets up from his seat in the back of the room and begins walking up the aisle toward Greg's desk. Keith moves over and sits down in the vacant seat belonging to Dan. Greg and Keith begin talking in low voices. Soon Greg smiles in response to a comment made by Keith. The boys continue talking in a low, but not secretive, voice to one another. The class is not disrupted. Apparently, both boys are very interested in their conversation. (Episode ends at "blip.")

8. This episode will be concerned with those people on the left side of the room, from the aisle over. Greg and Keith are still talking. Their conversation is a bit more animated than before. In the back of the room Donna leans forward, taps Sarah on the shoulder, and beckons Sarah to sit beside her. Sarah refuses. Bryan, who was previously reading, turns toward Sarah and Donna to see what is going on. Sarah turns back to her work. Donna reaches over her desk and taps Sarah on the shoulder again. Sarah turns around and smiles at Donna. Bryan continues to watch their activity. Sarah slides her chair back by Donna's desk where she and Donna continue their conversation with many gestures. Linda taps Donna on the shoulder in an annoyed manner. Donna ignores her and stands up apparently modeling a dress for Sarah. Linda continues to tap Donna on the shoulder. Apparently, Linda is even more annoyed by the interruption of the girls. Donna stands up once again and slaps halfheartedly at Linda's efforts to tap her. Linda gives up and turns back to her work. Sarah and Donna continue with their conversation. Bryan now looks around the room to see if anyone else is watching the activity. Keith and Greg, at the front of the room, are still talking and apparently are deeply engrossed in their conversation. Bryan prepares to get up from his seat, apparently to move over to talk to the boys in the back right portion of the room. (Episode ends at "blip.")

9. This episode is concerned only with a small group of seven children on the right side of the room. The group you are observing is discussing some problem in a very animated fashion. Ron and Suzanne seem to be arguing about some point. The level of volume in the conversation gradually increases as several members attempt to gain the floor. Carol, Jack, and Chuck seem not to be actively participating. The other members of the group seem to be deeply engrossed and actively engaged in conversing with anyone whose attention they can catch. As the argument continues, Chuck slides his chair back away from the group toward the blackboard. Half facing the group and half facing the blackboard, Chuck idly reaches over and picks up a piece of chalk and begins to doodle on the blackboard. The rest of the group seems unaware of his absence. Their attention seems to be directed toward an argument concerning the acquisition of supplies for the social studies play.

10. You are observing seven girls on the left side of the room. As the scene opens, a group of girls is discussing the kinds of materials they will need for their portion of the social studies play. Sarah appears to be the secretary for the group. She records the group's comments that they need paint and curtains for the play. Periodically the group's attention seems to be directed toward writing some ideas on slips of paper. Everyone appears to be writing except Wendy. As the girls continue their conversation in a productive fashion, Wendy's attention seems to be waning. At the end of the episode she is looking unseeingly at her textbook. (Episode ends at "blip.")

11. You are standing at the back of the room. The rest of the students are working elsewhere in the room. Keith is facing you. Bob is on his knees with his back toward you facing Keith. Keith begins the dialogue by saying, (voice dub) "So, you've been calling me a dictator. Why do you call me a dictator?" Bob replies, "Because you are." Keith responds, (voice dub) "But I was elected by the people. Doesn't that clear me?" Bob, still on his knees, turns to you and asks, (voice dub) "How could he be a dictator if he was elected by the people?" As Bob asks his question, the other boys in the group turn to look toward you.

12. The class members are studying quietly at their seats. Some are reading. Some appear to be working on a specific assignment. Ron pulls his social studies book from the row of books on the desk top and lays it out in front of him. After leafing through it, apparently looking for something, he closes the book and puts it back in its original place on the top of his desk. Randy, who is seated nearby, glances over to watch Ron's futile search. Ron pushes his chair back from his desk, gets up and begins to move toward the left side of the room. As he does, Randy also pushes his chair back and begins to run toward the same side of the room. Ron moves to the bookshelf and pulls a book from the shelf. Just as he starts to straighten up, Randy catches up with him. Randy reaches over and mischievously grabs the book Ron is holding. Both boys then begin to struggle for possession of the book. As the struggle continues they slide about the room moving slowly toward the back.

13. The class is quietly watching you as you talk. (Pause for five seconds.) Terry in the back of the room seems to be restless. (Pause for five seconds.) Bryan looks down at his desk slowly. Larry appears to be jotting something on his paper. (Pause for five seconds.) Carol watches you closely, then turns toward the back of the room. Terry and Keith appear to be interested in something at their desks. Bryan looks down at his desk, puts his head on his hands and apparently is tracing on the desk with his finger.

14. As you talk the class watches you, apparently attentive. (Pause for five seconds.) Donna leans forward and taps Sarah on the shoulder. Sarah turns to Donna and takes something from her. (Pause for five seconds.) Sarah turns, leans forward, and whispers to Mona. Mona turns to her, reaches out her hand and takes a small piece of paper, turns back quickly and faces you. Mona places whatever she received from Sarah in her desk. The remainder of the class continues to listen to you.

15. The class is still listening to you apparently interested in what you are saying. Mona takes the note from her desk and unfolds it and begins to read it. Dan looks over and notices the note that Mona is holding below the desk top. Dan smiles slightly then reaches over and quickly grabs the note from Mona. He then turns toward Greg and places the note between himself and Greg and they quickly begin to read the note. Mona tries unsuccessfully to grab the note back from the boys but Dan blocks her way. The boys continue to read the note eagerly. As the boys finish reading the note, Greg takes the note across the aisle to show to Bob and Ron. All three boys laugh and smile as they read the note.

16. The class members are working quietly at their seats. Some are reading and some are apparently working on some specific assignment of their own. Everyone seems involved in their own work. Shirley, on the right front side of the room, rests her head on her hands as she stares straight ahead. As you continue watching her she seems troubled or deep in her own thoughts.

17. In response to your question, Shirley responds with, (voice dub) ". . . I don't see how we'll look all right." The remainder of the class appears to be undistrubed by your conversation with Shirley.

18. Most of the class members are in small groups. There is one group writing and drawing on the blackboard, a second group in the back talking quietly amongst themselves, a third group on the left side gathered around Larry apparently watching him as he writes something on a piece of paper. Another group of students, at the front left of the room, are working individually at their seats on some task of their own. The children at the board are apparently playing some type of game, the boys at the back right continue to talk amongst themselves. Most of the conversations are fairly quiet as there is nothing to be heard to indicate the content of the various discussions. (Episode ends at the beginning of the second pan to the right.)

19. As the episode begins Suzanne will open the door and move into the room followed by several of the other class members. One of the comments that can be heard coming from the group is, "The projector would break down!" As the remainder of the children file into the room it becomes obvious that they are very disappointed at the loss of the opportunity to view the film. Additional comments are made indicating that they are disgusted and disappointed. The children all file into the room and sit down at their desks. Some stare at the desktops and some look toward you.

20. As you give the assignment the class listens only half-heartedly. Some of the children seem obviously tired, others appear bored. After you have finished giving the assignment, the children will pull their books out and place them disgustedly, some noisily, on their desks. The children begin leafing through their books looking for the page number you have assigned. Their commitment to the assignment is not impressive.

AUDIO-TAPE TRANSCRIPTIONS

Set II

1. The class begins to get out their books a bit noisily in response to your directions. The group does not seem particularly interested in the assignment. But all the children are following your directions and are preparing to go to work. You have moved from the front of the room down the center isle. As you move closer to Bob's desk he looks up at you and begins to speak, (voice dub) "Hey, you know what I got last night? I got this radio from the student teacher we had last quarter. She had this radio and it didn't work. And, she said I could have it if I would fix it up. I was testing the tubes out last night and there were some that were good and some that were bad. But I think I know what the trouble is now."

2. As the episode begins Karen is reading, (voice dub.)"During the rainy season in Brazil nearly 500 inches may fall in the Amazon Valley. More water flows into the Amazon than into any other river in the world." As Karen reads, the members of the class appear to be very attentive with the exception of Bryan. Bryan is apparently following along with the materials in the book but he is tapping his pencil on his desk. Karen continues reading, (voice dub) "Sometimes so much rain falls that the river's banks cannot hold the waters. The water rises and over-flows its banks." The class still seems to be following along as Karen reads. Bryan is still tapping his pencil as he follows along with the reading in his book. The episode ends with Karen still reading and the rest of the class following along still unaware of Bryan tapping his pencil.

3. Once again the class follows along as Karen begins reading, (voice dub) "According to this theory all of western South America was raised above the sea when the Andes Mountains were pushed up. As the land gradually rose during millions of years, the water turned to the east." Karen looks toward you and says, (voice dub) "I don't see how that works." Some of the members of the class look at one another and smile. Others turn to face Karen. (Episode ends with Karen's question--rest is one feedback.)

4. As you watch the class from the left side of the room, all of the children seem to be involved in studying or in some individual assignment. The room is very quiet. Suddenly there is a loud clatter at the back of the room and Donna screams. A string of beads has broken and has fallen on the floor. Most of the members of the class turn around to face her. Some get up quickly from their chairs and run back toward her. Donna stands at the back of the room smiling, grinning, and shrugging her shoulders. Many of the members of the class scramble about the room to pick up the broken beads. There is a great deal of noise from their rapid movement about the room and some laughing that occurs. Donna appears embarrassed.

5. Everyone is studying quietly at their seats. The only exception to this is Bob and Ron who are quietly discussing something between themselves. Bob seems to be taking leadership in the conversation evidenced by his gestures in explaining something to Ron. As they continue talking, some of the boys in the back of the room look up to see what's going on. Bob and Ron continue talking quietly to one another.

6. Following your directions to move outside for recess, the class stands up and begins to move outside in a very orderly fashion. After about one-third of the children have left the room, it becomes evident that Terry and Jack have not made much of an attempt to leave yet. As the remaining members of the class move outside, Terry and Jack are still in the room sitting in their chairs. Terry motions to Jack to slide his chair over by his. As the boys get near one another they clasp arms and begin trying to pull one another from their chairs. Both boys playfully kick each other's chair and push each other away with their feet. Once again they clasp hands and try to pull each other out of their chairs. As the activity continues, the boys and their chairs are pulled about the right corner of the room.

7. Following your instructions the class begins to pass their papers in. They perform this activity in an orderly fashion. As you begin to move down the aisle to pick up the papers, Bob sits first with his head in his hand then looks down in a rather embarrassed fashion at his desk. Grimacing, he then reaches over and takes the papers from Ron to hand to you. As Bob hands the papers to you he says, (voice dub) "Uh . . . I didn't get my assignment finished last night."

8. The first person to respond to your question is Carol. She says, (voice dub) "They stay green all year around." Terry responds next with the statement that, "The book says they don't lose their leaves." As individual members respond the other class members turn to face each of them. In response to Terry's statement that evergreen trees don't lose their leaves, Ron says, (voice dub) "My dad says that they do." (Voice dub of other children.) "What." "What did he say?" (Voice dub for Ron.) "Well, at least one kind does. It's . . . uh . . . I can't remember." Ron and the class look at you expectantly.

9. As the episode begins Ron decided to check his information on evergreen trees. He states, "I'll go look it up." Ron then stands up and begins to move toward the bookcase. As Ron begins to move toward the bookcase, Terry jumps up from his seat in the back of the room and begins to race Ron toward the bookshelf. As Ron reaches the bookshelf, he selects the book he wants from the shelf. Immediately Terry grabs the same book. The boys then begin to scuffle about the left side of the room for possession of the book. The class members watch them with great interest.

10. Three pairs of girls in the back of the room begin to dance to the records. They are dancing in an orderly fashion. As the dance continues Bryan moves toward Chuck and gestures in such a manner that it becomes apparent he is asking Chuck to dance with him. The two boys begin to dance. Soon they are amongst the girls pushing and shoving each other and bumping the girls. The girls attempt to ignore the boys. The boys continue dancing in their mildly agressive manner.

11. The girls that you are observing seem to be discussing something amongst themselves. Their voices are rather quiet so that it becomes impossible to distinguish what they are saying. Finally someone says, "Well, we could all do it together better." As the girls continue discussing their topic, Yvette begins to brush Mona's hair. Mona continues to discuss the project with the other girls as Yvette continues to brush Mona's hiar.

12. As you are standing near the group Yvette looks up to you and asks, (voice dub) "Mr. Land told me I had to return this library book. May I go?" She and Mona look at you expectantly.

13. In this episode you will be concerned with the children on the left side of the room. As you move down the center aisle the children seem to be attentive to their task. They all are reading and seem to be engrossed in their work. Donna, at the back of the room, sees you approaching and smiles half-heartedly. As you near her she lifts her social studies book up. As you approach closer she smiles again, this time in a rather embarrassed fashion. The rest of the people in the room are quiet. Donna again looks at you and smiles self-consciously.

14. As you are standing at the right side of the room all the children are lined up to go out to recess. They are in a very orderly situation. Terry steps out of line and approaches you and states, (voice dub) "Mr. Land said that we should practice real hard for the track meet. Suppose I could stay out just a little bit longer with the other guys?"

15. The children who are still in the room are fairly quiet. Some of them are moving about the room but not in a disruptive fashion. Some children, including Bob, are at their seats apparently working on some project of their own. Bryan moves down the center aisle toward the front. As he approaches Bob's desk he reaches over and pushes him on the shoulder. Bob ignores him. Bryan then reaches over and snatches away the radio plans that Bob had been working on. Bryan begins to run toward the left side of the room. Immediately Bob jumps up in pursuit. As they reach the left side of the room, Bob catches Bryan and wrestles him to the floor. They continue wrestling on the floor and some of the children stand up to watch and lend support to their favorite.

16. The four girls are working quietly. They are commenting to one another about their own preferences for coffee as a beverage. As they continue talking in this quiet fashion, Linda looks up at you and raises her hand. As you approach, Linda says, (voice dub) "I don't feel good. I've been having stomach pains for the last two weeks and they bother me something awful." Linda and the other group members look at you expectantly.

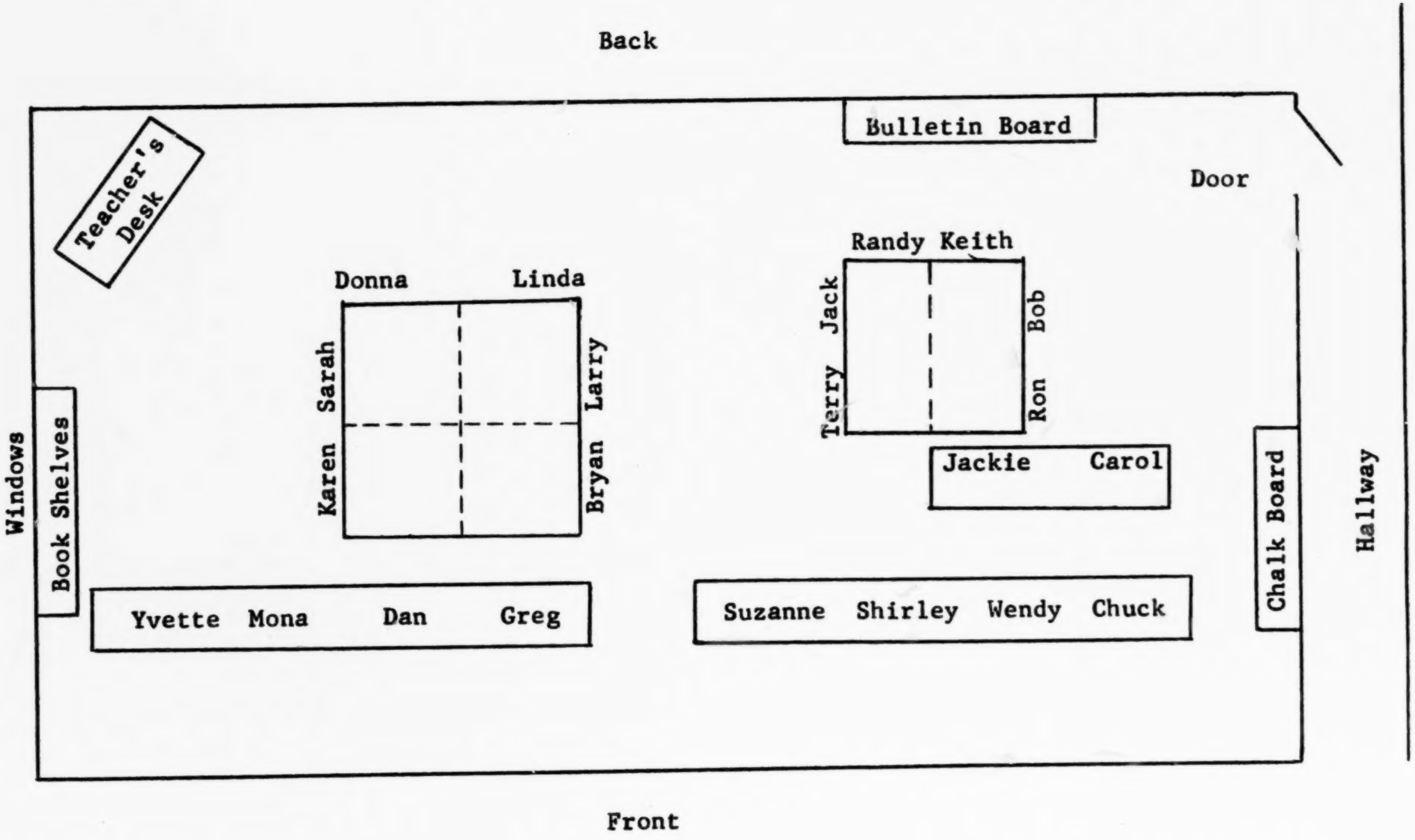
17. As Karen begins the book report, most of the members of the class are listening closely to what she says. Karen begins to speak, (voice dub) "My book is In the Saddle with Uncle Bill and it's written by Will James. And it's a real good book, but . . . in some places it doesn't make sense." Suzanne then asks, "What do you mean it doesn't make sense?" Karen replies, (voice dub) "Well, right here it says, 'they was apt to gulp down their food as they started to eat. But after the first few mouthfuls and thinking of how they'd done with the water, they looked at

one another with warnings once again and slowed down after tasting what they'd et. It had all tasted mighty good, far better it seems than anything they'd et before and there was no easing their appetites for quite a spell.'" (End of episode.)

18. As Ron begins to speak, the class seems to be attentive to his book report. Ron begins his report by saying, (voice dub) "Well, this book that I am reporting on is called the Bounty's Boy by I. G. Edmonds and I got it from Mr. Land. He . . . I . . . ah . . . he got it at the city or . . . at the state library. And it's about this boy who signed up with Bounty. He . . . ah . . . signed up in . . . ah . . . England and joined on after a little trouble and then he finally on their way . . . go along for a little while." The class seems a little less interested in this report. Ron, flipping pages in the book, continues, (voice dub) "Then they get to the . . . uh . . . then they get to . . . Tahiti . . . and, give the . . . are getting . . . some breadfruit trees to feed the slaves . . . in the islands in the . . . the West Indies . . . the British colonies there."

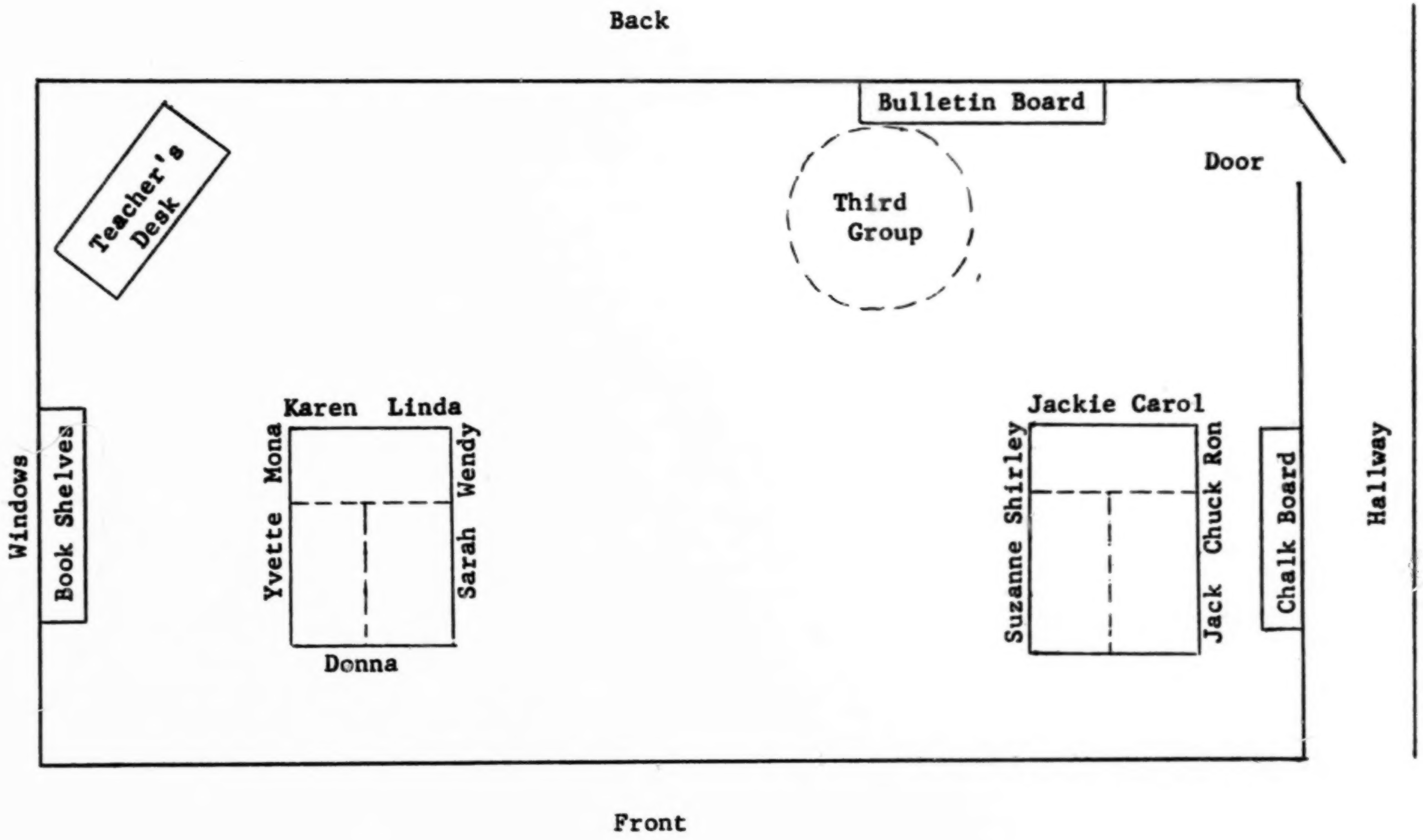
19. Except for Bob, the remaining four members of the group seem to be engaged in some conversation concerning their topic for the social studies project. Bob is sitting and listening to the boys as they converse. The boys' voices are fairly quiet. As you continue to watch, Bob turns to face you and begins to speak, (voice dub) "I was just thinking. Last night I was working on my radio, but . . . it always seems like I have something else to do. Gee, I sure hope I'll have it done in time for the World Series." As Bob finishes speaking, he looks at you expectantly. The boys in the group have apparently been undisturbed by Bob's conversation with you.

20. As you stand at the left side of the room, the boys are across the room by the blackboard explaining their science project. Dan is speaking, describing the apparatus that they have used while Greg draws a diagram on the board to explain the process involved in this experiment. The remainder of the children in the room are apparently attentive to the two boys. Suddenly Donna says, "Oh, no!" As you look toward her desk, you notice that she has tipped over a small vase filled with flowers and water. The water apparently is running on the floor. Donna stands up and repeats, "Oh, no!" For a moment Donna stands helplessly watching the water drip on the floor. The children in the room turn to watch her. The boys at the blackboard stop and look back to see what the problem is. Donna begins to clean up the mess.



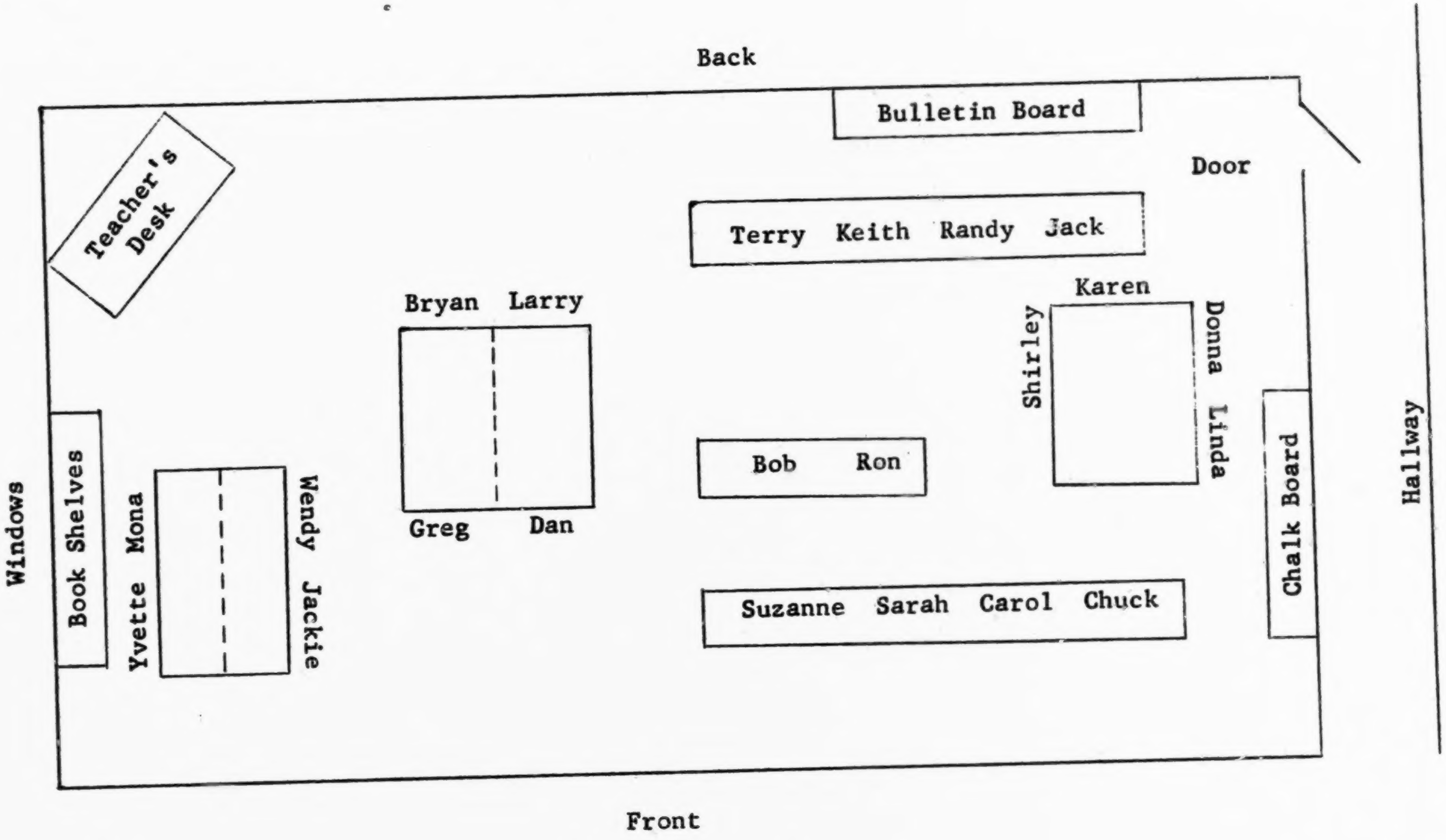
SEATING CHART FOR "MR. LAND'S" CLASSROOM

Set I
Episode: 12



SEATING CHART FOR "MR. LAND'S" CLASSROOM

Set I
Episodes: 9, 10, 11



SEATING CHART FOR "MR. LAND'S" CLASSROOM

Set II
Episodes: 11, 12, 16

APPENDIX D

DATA COLLECTION MATERIALS

SIMULATION POSTTEST DATA

Name____________________
Series___________________

Ep.	Time	Dc	R	Ep.	Time	Dc	R
1	____	____	____	11	____	____	____
2	____	____	____	12	____	____	____
3	____	____	____	13	____	____	____
4	____	____	____	14	____	____	____
5	____	____	____	15	____	____	____
6	____	____	____	16	____	____	____
7	____	____	____	17	____	____	____
8	____	____	____	18	____	____	____
9	____	____	____	19	____	____	____
10	____	____	____	20	____	____	____

CLASSROOM SIMULATION TRAINING DATA

Date ____________________
Session ____________________

Name ____________________
Treatment ____________________
Program ____________________

Time	Episode #	Obj.	Re	Re

APPENDIX E

ORIENTATION MATERIALS

Description of School and Community[1]

Mr. Land's sixth grade is one of two sixth-grade classes in a small elementary school of approximately 300 students in the Pacific Northwest. The school, College Grove Elementary, serves a small community and the surrounding rural area. It is also used extensively by the state college nearby in connection with the teacher education program of that institution. Most of the elementary school staff also hold appointments with the college as supervising teachers. The youngsters in the school are used to visitors and a constant turnover of student teachers. The sixth-graders have been exposed to television equipment as part of special demonstrations, have been selected out individually for special testing and observation by college students, and have even been used as subjects in research experiments with teaching machines, educational films, and team teaching.

All told, the morale of the College Grove Elementary School staff is high. The rapidly growing college is having a very evident impact on the community. New houses are being built at an increasing rate. The city council has been awarded a planning grant for an urban renewal project and the homeowners in the blighted areas of the community have been cleaning up their neighborhoods, painting and rebuilding rundown dwellings.

There are six grades in the College Grove Elementary school, plus a kindergarten which is supported, primarily, by the college. There are no state-supported kindergartens. The school population is relatively stable, so most of the youngsters in Mr. Land's sixth grade have been in residence since the first grade. In the last two years Mr. Land has had this particular class, so he knows the youngsters and their parents very well by now. He is a very warm and supporting teacher, so he has won the love and respect of this class. They confide in him and seek his counsel and advice on almost any matter of personal concern.

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[1] Kersh, 1965a

Mr. Land is not a strict disciplinarian. The class members are given a great deal of freedom and responsibility for their own behavior. However, there is one principle which is strictly enforced; any behavior which interferes with the efforts of others to learn is not tolerated. Mr. Land feels that learning can take place in any situation, and at any time. He encourages individuals and groups to engage in projects of self study and often will allow youngsters to pursue a line of personal interest, even when it interferes with the regular program of instruction. He does not advocate any particular learning theory or philosophy of education, but evidently feels strongly that his primary role as teacher is to remove all obstacles to learning and to foster a social environment in the classroom which will open lines of communication between student and teacher.

The Principal of College Grove Elementary School allows the instructional staff a great deal of freedom in the conduct of their respective classes. He is proud of his staff and lets them know frequently, in public, that he considers them to be master teachers capable of supervising student teachers, conducting demonstrations, and generally assisting him in the functions he is responsible for as Principal. At the same time, the Principal has the difficult task of attempting to offer [illegible] kind of program that the state college requires and at the same time to operate within the budgetary limits and somewhat restricting policies of the school board.

The school has a part-time nurse, a very adequate curriculum library, and has access to the Educational Media Center and library resources of the state college. It also has access to the physical education facilities of the college, making use of the pool, gym, and other facilities.

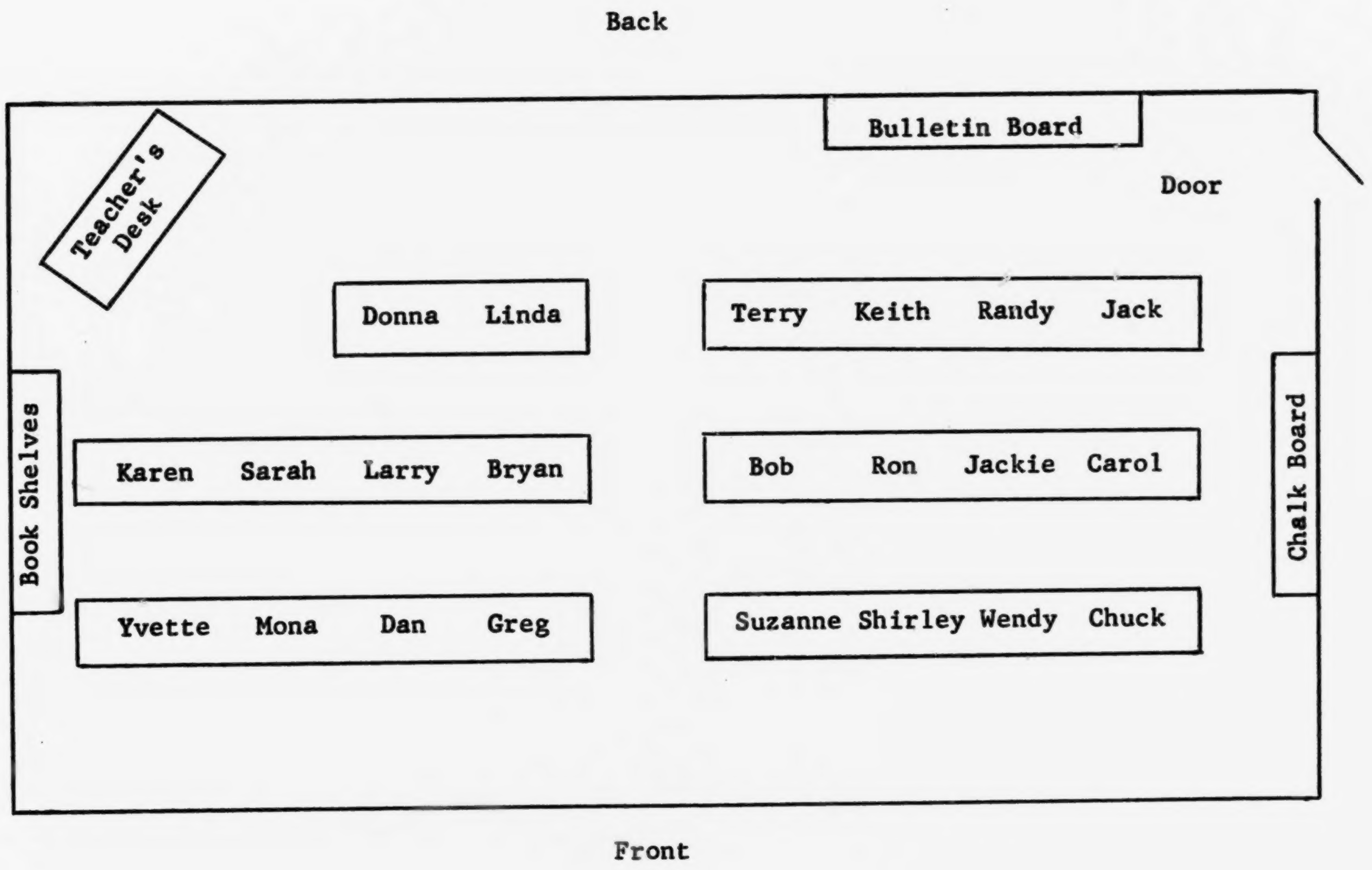
The Community

The town of College Grove has a population of approximately 7,000 people and is the home of Pacific State College. No one is quite sure how many of the 3,500 college students are included in the town's census. If it were not for the influence of the state college, College Grove would not be considered very prosperous. It has no industrial support, and a large portion of the population are people over the age of 50. Despite its obvious dependence on the college, the townspeople have not identified closely with the college until recently. Consequently, the merchants and city fathers are oriented primarily to the needs of the farmers and workers in the lumber industry in the surrounding area.

College Grove is not isolated, by any means. Just two miles away is the town of Milton which is just slightly smaller in population. Milton, however, is the center of business activity for the two communities. The city planners feel that the two communities are rapidly growing together. Already the two communities have integrated their schools and built the new high school exactly half way between the two city centers. A new supermarket was built two years ago and is also located across the highway from the high school. People in the surrounding area are prone to speak of the two communities as the "College Grove-Milton" area.

Milton is built along the banks of a large river so the local lumber industry is concentrated in that community as well. In fact, Milton has a small operating lumber mill.

Generally speaking, the two communities of College Grove and Milton constitute a single, loosely knit community of approximately 12,000 persons in the midst of several other larger communities. Ten miles to the north is another community of approximately 6,000. To the south 20 miles is a community of 25,000 people and to the east 18 miles is the state capitol, population 65,000. Eventually College Grove and Milton may become the suburbs of the capital city.



SEATING CHART FOR "MR. LAND'S" CLASSROOM

Orientation

APPENDIX F

TRAINING MATERIALS

TABLE 76

CLASSIFICATION OF PROBLEM EPISODES[1]

Student Behaviors Represented	Episode Types Included in Film:	
Management Problems	I	II
Disorderly behavior	4	5
Disregard of instructions - inattention	1	0
Disregard of instructions - fatigue	2	0
General discipline	2	2
Communication Problems	I	II
Confusion	1	2
Inattention - individual	0	3
Inattention - group	1	1
Inattention - fatigue	3	0
Home-school interest conflict	2	2
Learner challenge	2	1
Rules of procedure	0	1
No problem	1	0
Inattention - individual; group ineffectiveness	1	1
Rules of procedure; baiting-testing	0	2

[1] Kersh, 1965a

Principles of Behavior[1,2]

1. In situations involving rules of procedure when the student teacher is not informed of the rules, defer to authority vs establish own rules.

2. Be attentive to the entire class as well as the individual vs be attentive either to the individual or to the class only.

3. When learners appear bored or inattentive in a situation that does not fulfill the instructional objectives, deal with the group vs deal with the individual(s).

4. When confronted with conflicting home-school interests, maintain a neutral position vs take sides.

5. When learners exhibit behavior which deviates from instructional objectives, deal with the individual(s) directly with minimal disruption of instructional continuity vs disrupt instruction.

6. Encourage student initiative to learn vs discourage student initiative to learn.

7. When direct action is required to control a disruptive group or individual, communicate at close range vs communicate from a distance.

8. When direct action is required to control a disruptive group or individual, act quickly vs delay.

9. Show supporting manner vs show nonsupporting manner.

10. When learners appear disinterested or confused, stimulate a more active, interested response vs make no effort to change the learner's response.

11. Discourage undesirable behavior vs encourage undesirable behavior.

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[1] Kersh, 1965a

[2] These standards have been written with the positive action first. The segment following the versus (vs) indicates a "mirrored" or negative action that the St might implement unsuccessfully. The experimenter uses the standards as criteria by which he may categorize a St's response, i.e., for standard 1 the St may defer to authority be telling a student to "Ask Mr. Land" or he may establish his own rules by saying "Yes, you may go now."

Categorization of St Responses: An Example

A hypothetical dialogue is shown below to exemplify the categorization of St responses. The example shown is based on an episode whose assigned standards are: (1) in situations involving rules of procedure when the student teacher is not informed of the rules, defer to authority vs establish own rules, and, (2) show supporting manner vs show nonsupporting manner.

Filmed problem scene: Scene opens on class about half empty. Jack approaches the St and says that he has been sick the previous day and should not be allowed to play during recess.

St: "How do you feel now, Jack?"
E feedback: "Jack would say, 'I still don't feel well.'"
St: "Well then, why don't you go back and rest."
E feedback: "Jack would nod and return to his seat."

In the example given above the E first attempted to force the St to make a decision about Jack by merely reiterating Jack's dilemma. The second E feedback was a description of one of the filmed feedbacks originally prepared by Kersh. The E's description of the feedback is intended to be non-evaluative of the St's response.

The St's response would be categorized as a type B (see bottom) or as being supportive but not instituting standard (I) by establishing the "rule" that Jack might rest rather than participate in the recess.

TABLE 77

SCORING MATRIX

	Used Standard I	Did Not Use Standard I
Used Standard II	Response Type A-- 3 points	Response Type B-- 2 points
Did Not Use Standard	Response Type C-- 2 points	Response Type D-- 1 point
No Response Given to the Stimulus Situation	Response Type E 0 points	

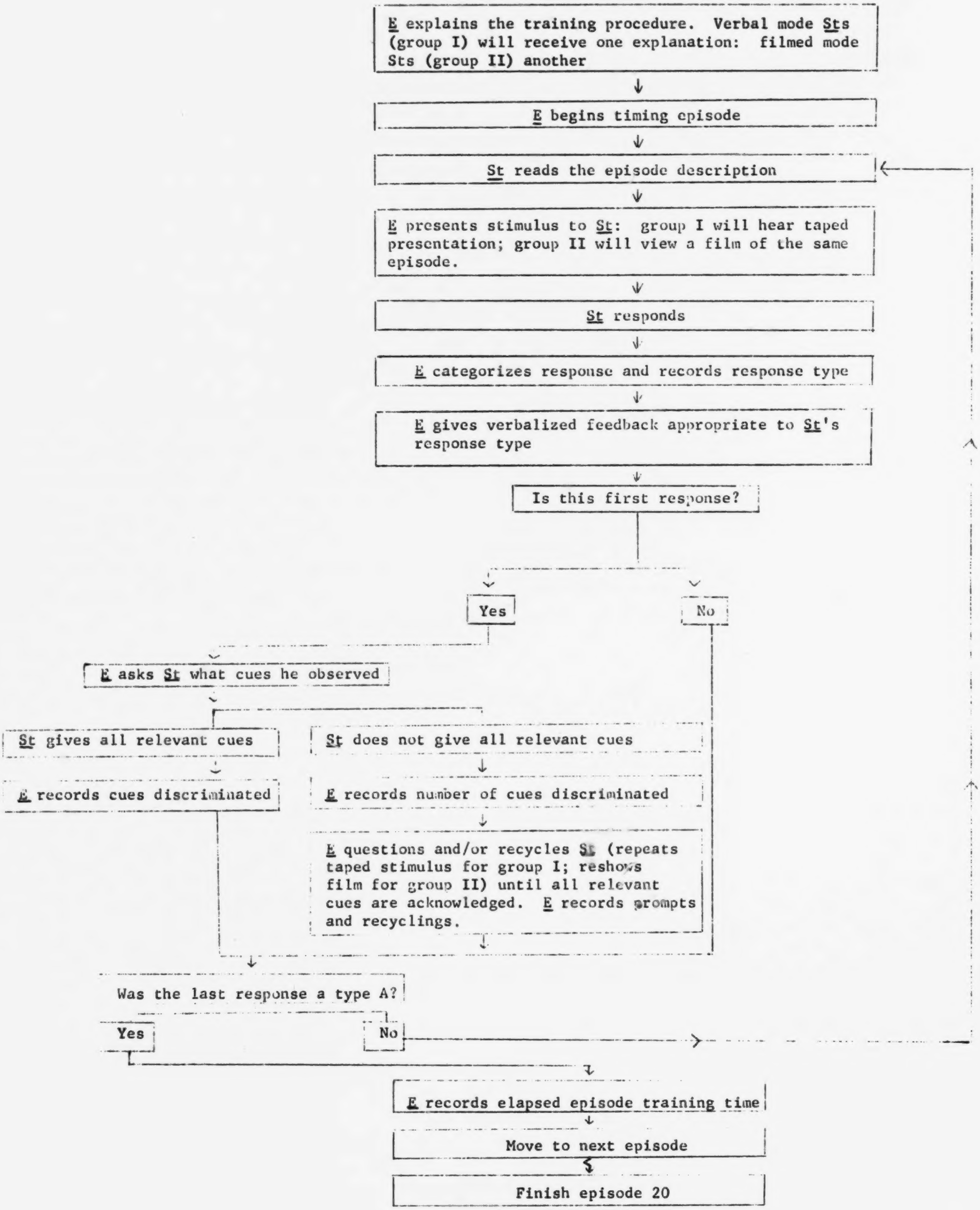
E explains the training procedure. Verbal mode Sts (group I) will receive one explanation: filmed mode Sts (group II) another
E begins timing episode
St reads the episode description
E presents stimulus to St: group I will hear taped presentation; group II will view a film of the same episode.
St responds
E categorizes response and records response type
E gives verbalized feedback appropriate to St's response type
Is this first response?
Yes
No
E asks St what cues he observed
St gives all relevant cues
St does not give all relevant cues
E records cues discriminated
E records number of cues discriminated
E questions and/or recycles St (repeats taped stimulus for group I; reshows film for group II) until all relevant cues are acknowledged. E records prompts and recyclings.
Was the last response a type A?
Yes
No
E records elapsed episode training time
Move to next episode
Finish episode 20

Fig. 9.--Simulation training format.